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ECONOMIC DEVELOPMENT AND CULTURAL CHANGE
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THE ECONOMICS OF GOVERNMENT PAYMENTS TO LIMIT POPULATION*

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This paper explains why certain governments should seek to reduce the birth rate in their countries and how they can use money incentives to do so. It proposes that these governments should pay bonuses to men who have vasectomies or to wives who do not become pregnant over periods of time. Schemes of this kind may be politically possible in some underdeveloped countries with increasing population problems. In fact, in India, several state governments and private companies are already offering employees free vasectomies plus a very small bonus.

These ideas are of special importance to countries that have high birth rates and where resources invested in children do not earn as high a return as resources invested in ordinary capital projects. Then the government can afford to pay a money bonus to men and women for each birth permanently prevented. In some countries, this transfer payment may well exceed annual per capita income.

However, the resource costs of such schemes are a small fraction of the money cost involved.* Hence, to the extent that men and women participate, they are several hundred times more effective in raising per capita national income over say a ten year period than are resources of equal value invested in traditional development projects. Such a factor of advantage should not be ignored.

I. What Rate of Births is Excessive?

It is more useful for governments to worry about birth rates than population per se. Governments cannot limit population growth by raising the death rate. So they must concentrate on lowering the birth rate where "overpopulation" exists or threatens. A lower birth rate also reduces the proportion of population that is too young to work.

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* The ideas presented in this paper were stimulated by discussion with senior officials of the Government of India and the Prime Minister in New Delhi. The paper itself was read to the Econometric Society in Washington, D. C., December 29, 1959. Another much more detailed paper was sent to officials in India during the summer of 1959.

An economy is having too many births for the economic welfare of the existing population if the estimated present value of infants born this year is negative. This can arise for two reasons. First, the prospective additions to output occasioned by this year's infants may be less than their future subtractions from others' consumption. Second, discounting will reduce the present value of this year's infants' future production more heavily than that of their future consumption. In many backward countries these two situations combine to give current births a negative present value in economic terms.

The former circumstance--namely that extra people born will over time add less to output than they subtract for consumption--has three causes. First, many babies do not survive to working age and so only consume. Second, the prospective marginal product occasioned by extra workers may be far less than their average product, because the ratio of workers to capital and/or resources is very high, even given reasonable hopes of capital increase and technology advance. Third, the consumption of extra population, age for age, is proportionate to that of the rest of the population; its consumption is not based upon its marginal product.

The other circumstance--that production occasioned by extra current births is discounted more heavily than consumption--has two main causes. First, young children are an economic cost from birth, but they do not contribute to output until much later in their " 'teens." Second, most countries that seem "overpopulated" are very short of capital, so that the rate of return on produced means of production is high.

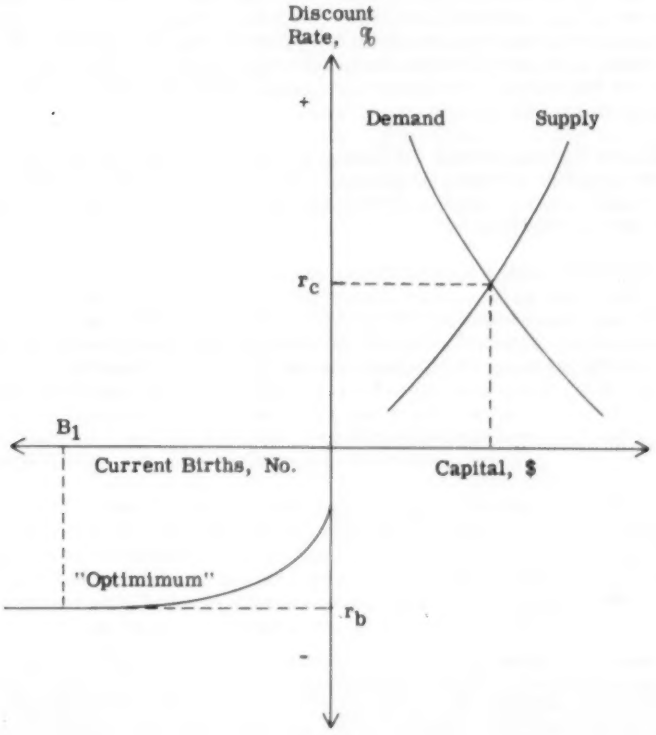
Conceptually, to determine the present value of infants born into a country say in 1960, one must estimate the probable addition to output value they will occasion year by year. From this must be subtracted their consumption year by year. The first ten to fifteen years will have negative values in both advanced and backward economies. The next forty years or so--taking men and women together--should have a positive value except in grossly overpopulated countries. Those of today's infants that survive will collectively add more to output, in say 1985, than they subtract through consumption, unless the marginal physical product of extra population is very low indeed. These net yearly values--negative in early years and perhaps positive in later years--must be discounted by a rate that reflects the rate of return that the economy can realize on resources otherwise invested during this period. If the present discounted value of these future net amounts is negative when summed, babies born this year are a liability.

However, there is some rate of discount that will give this future stream of extra output minus extra use a zero present value. If this discount rate is algebraically lower than the prevalent rate obtainable from invested resources, current births should be reduced. The productivity of extra capital in many underdeveloped countries may often justify a 10 or 15 percent rate of discount. But the rate of discount that yields a zero present value on this year's infants may be negative in some overpopulated and backward countries.

Analytically, we have a system in which there are three main functions. One relates the supply of capital--and another the demand for it--to size of population and rate of discount. The third and more novel function relates the "optimum" number of new births--that is the number that will yield a zero present value--to population size and discount rate.

Figure 1 shows, for a "given" population projection, two boxes. In the left box is the number of current births during some period together with the rate of discount that will yield a zero present value on them. In the right box the demand for capital and the supply of capital are shown in relation to the discount rate. The situation depicted is one of overpopulation, for the expected number of births (B_1) is associated with a very different discount rate (r_b in the left box) from that expected in the capital market (r_c in the right box).

Fig. 1. Disequilibrium between Resources Invested in New Population and Real Capital



To be able to define such relations--let alone estimate them--more must be stipulated. The "given" population might be the projected population 25 years from now, at the birth and death rates now expected in future years, and disregarding induced changes in the number of births during the current period. If this "current" period is short--such as a year--there may be no number of births that will be in "equilibrium" in the sense that the same rate of discount

will apply in both boxes. But if the current rate is too long--say twenty-five years--there are all sorts of second generation and other effects that cannot be disregarded.

The positions of these curves depend on the projected population. If a re-estimate of population growth during the next 25 years is much lower, the demand for capital schedule will shift to the left. But the supply of capital schedule will probably shift less, or even more slightly to the right, so that the discount rate in the right box should now be lower. The "optimum" births schedule in the left box will shift upwards with a lower projected population. [1]

In Figure 1, a discount rate in the left box lower than in the right box indicates that resources invested in newly born children will not earn as high a return as resources invested in ordinary projects. If the supply of capital is somehow increased, and discount rates fall in the right box, some births that are now submarginal may become marginal. On economic criteria alone, births are a liability that can only be "justified" in the left box by discount rates lower there than those prevailing in the right box.

So much for the concept. In practice, only very rough estimates can be made of the expected marginal production and expected average consumption that will result from a population increment through births. In 25 years time there are several "feedbacks."

Fortunately, at the high discount rates common to overpopulated countries, far future events have little impact on present values of current births: a 10 percent annual discount over 25 years leaves only a .07 present value. So, while we can never estimate precisely the discount rate that gives some number of current births a zero present value, we can often be reasonably sure it is less than the going investment discount rate. We can never know the exact "optimum" number of births for a given year, but we may be sure that it is much lower than the probable number. [2]

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1. It would of course be possible to construct another Figure, substituting a population axis for the discount rate axis, which for a given discount rate would indicate the compatibility or incompatibility of expected births (in the left box) with equality of demand and supply for capital (right box).

2. Parents--and especially those who have lost children--should realize that these economic considerations need not run counter to emotional ones. Serious overpopulation at best means that children are unable to develop to their full physical and mental potential. At worst it involves a variety of miseries and the frequent tragedy of death in childhood.

II. Government Bonuses for Limiting Births

The time may come when some Asiatic countries will seriously consider government bonus schemes for limiting births. Although their cultures have traditionally stressed fertility, their great religions are not explicitly opposed to population control. Their governments are now politically independent and most of them favor economic planning that is supposedly long range.

Economic necessity must invent some new approach to population in non-Communist Asia. Expected annual population increases are from 1.5 to 2.5 percent. Expected savings rates are from 5 to 8 percent of national income. These savings are inadequate to raise per capita production without widespread technological advances.

The willingness versus ability of adults to limit births has long been a matter of controversy. Many cultures have historically limited family size--but often after conception--without any knowledge of modern birth control devices. A cheap and available contraceptive pill will not be the answer in Asia unless couples wish to avoid pregnancies. Government exhortations to limit births in the public interest have run against the private advantage of having them. In the "extended" or three generation households of Asia, which still predominate in rural areas, children are not a liability to their parents during their infancy. And they are a real asset in later life to their procreators.

It is not enough for governments in these countries to support clinics that provide contraceptive information. It is not practical to tax extra children. Instead, governments must offer some strong and positive inducement to couples to limit births. Money might be such an incentive if paid in large enough amounts. Or other costly benefits, such as the education and support of parents' existing children, might be offered.

There are various possible bonus schemes, which a national government might adopt, but only two will be briefly described here.

One is to pay a cash bonus to married men, limited perhaps to those who already have a child and a concurring spouse, who request a free vasectomy.[3] This method of sterilization can be done in about half an hour, needs only a local anesthetic, and requires no hospitalization. It does not affect sexual desire or satisfaction. But it destroys fertility and is practically irreversible. The resource cost of performing the operation is very slight and medical students could soon be trained to do it.

A supplementary scheme is for married women to register if they wish with government clinics. Every four months they present themselves for a brief and superficial examination, by approved midwives, adequate to determine whether or not they are pregnant. Each successive "non-pregnant" finding gives

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3. There would probably be a waiting period of several months to give the volunteer time to reconsider, so avoiding operations requested on temporary impulse.

them another credit in a savings account which remains blocked until the value of a prevented birth has been accumulated. Subsequent credits are not blocked. The blocked amount is released if the woman attains 45 years--or dies earlier--without missing an examination or having a positive one. It is cancelled if she has a baby.

How a woman avoids pregnancy at 17 week intervals is up to her and her husband. Presumably, more couples will turn to birth control clinics for help and there will probably be an induced increase in illegal abortions. The administrative costs of this scheme are somewhat higher relative to the birth reduction achieved. But it provides an important alternative to male sterilization.[4]

These schemes will only be effective to the extent that eligible men and women participate. Initially the bonuses may have to be quite large to attract "volunteers." The government can afford to pay a sum that depends on (1) the value to the rest of the economy of permanently preventing a birth, (2) the expected number of births prevented by the "volunteer's" participation, and (3) when these prevented births would have been expected to occur.

The value of a permanently prevented birth to the economy is--as we have seen--the discounted present value of a representative infant. In many backward and overpopulated countries the annual per capita income is about $75. The present value of a typical infant's consumption--allowing for deaths, low consumption rates as children, and discounting at 10 percent a year--may be $200. If the maximum output of those who survive is between 20 and 40 years of age, and the marginal product of population is about a quarter of its average product, the present discounted value of a representative infant's future production may be about $75. Then the economy, through its government, can afford to pay $200 minus $75, for each birth permanently prevented.

The cash bonus that can equitably be paid to a man requesting a vasectomy will depend on the number and birth dates of the extra children he would be expected otherwise to have. This will depend on his age, that of his wife, and various social attributes. In many Asiatic countries, a married couple aged about 25 will on an average have about three more children during the next fifteen years. In such a case--discounting from future birth dates--the maximum bonus would be roughly $150.

Bonuses to registered women, who on examination every seventeen weeks are found not to be pregnant, will depend on the normal fertility at their ages. In the 25 to 30 age group, fertility rates of .25 a year are common in many overpopulated countries. To these women, a bonus of about $30 a year, or $10 on each negative examination, is possible. However, until about $125 has been accumulated in a blocked account, no payments would be made. This amount, roughly the value of a prevented birth, would continue to be blocked during the fertile period of a woman's life unless cancelled for pregnancy or avoidance of inspection.

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4. Female sterilization, being relatively difficult, is costly of resources. If the government provided this operation gratis, its cost would have to be deducted from any bonus.

If the bonus scheme in time evokes many participants, these money rewards should be reduced below these maximum demand prices. The rest of the economy--through the government--does not wish to pay the participating families more than necessary. In practice, the poorer classes may participate disproportionately, so that these plans will incidentally result in some income equalization.

The resource cost to the economy of these schemes is only a small fraction of the money cost to the government. In underdeveloped countries, vasectomies can probably be performed by special clinics doing nothing else, and by medicos trained to do only this operation, at a cost of a few dollars each. The administrative costs of the non-pregnant payments to women might be 50 cents a year per registrant. Thus, resources valued at a million dollars a year may over ten years permanently prevent around three quarters of a million births. The present value of the net consumption saved will be about $50 millions. In contrast, a million dollars of resources invested in ordinary development projects over ten years, can only add output during that period of about the same value. This is a rate of return of 50 to 1. And, over ten years, the percentage change in population resulting from these schemes may be several hundred times greater than the percentage change in national income.

III. Applications to India[5]

The population of India is increasing at about 2 percent a year. It has been estimated that from 1961 to 1971 it will increase from 424 to 532 millions--partly from a continued fall in the death rate--if birth rates do not decline. When the current Second Five Year Plan ends in 1961, consumption per capita may not have increased. And about two-thirds of the gains that can realistically be expected from a feasible Third Plan will be swallowed by population increases. It is not surprising that some state governments and private companies are offering free vasectomies to their employees. What is needed though is an expanded program with money bonuses conducted by the national government.

Rough estimates suggest that the value of permanently preventing a birth in India is about Rs. 500.[6] This is almost double the annual per capita consumption. Vasectomy bonuses of roughly this amount are reasonable and should be a sufficient inducement to many.

Table 1 summarizes, per million births prevented, some very rough estimates of the possible benefits and costs over a period of ten years. It is assumed that about two-thirds of the prevented births result from vasectomies.

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5. The following is a very brief summary of a more detailed paper, concerned only with economic development and population control in India, scheduled for publication May 1960 in the Revue of Economics and Statistics.

6. The rate of exchange is about 5 rupees to a dollar.

Table 1. Economic Gains from Preventing Births through Money Incentives

(Per Million Births Prevented Over Ten Years)

1. Resource cost	Rs.	.62 crores
2. "Saved" consumption	Rs.	30. crores
3. Maximum bonus costs[a]	Rs.	54. crores
4. Reduction in population		.0021
5. Alternative increase in national income		.0000042

(Rs. 1 crore equals $2 million)

a. Transfer payments only.

The resource costs (item 1) are predominantly domestic labor costs. There would be few imports required. Of course, if an unnecessary degree of training is required of medicos and midwives, administrative costs will be much higher and the program will be constrained by lack of personnel.

The "saved" consumption of Rs. 30 crores ($60 millions) is the present value of the extra net consumption that the rest of the economy will now have because these million "mouths" have not been born to eat and work.

The money cost of Rs. 54 crores (item 3) amounts to about $100 per birth prevented. However, these are transfer payments in a sense and do not reflect resource expenditures. (Incidentally, in the Second Plan, the Government of India budgeted Rs. 4 crores for birth control clinics.)

A reduction of one million births over ten years would be a .0021 reduction in the 473 million population unofficially estimated for 1966. Of course it is to be hoped that there would be sufficient funds, trained personnel, and participants for a much larger program. Over ten years, merely to offset further prospective death rate declines, about 12 million births must be prevented.

The last two items in Table 1 together indicate why it may be several hundred times more advantageous to invest resources in preventing births--in the ways suggested here--than in traditional development projects. The goal of most governments is to increase the ratio of national income to population. The table suggests (items 1 and 4) that population can be reduced over ten years by decrements of .0021 at a cost of Rs. 0.62 crores each. Resources of equivalent value would only yield an addition to national income over ten years of about Rs. 0.7 crores if invested during this period in industrial and agricultural projects.[7] This would be roughly a .0000042 increase in national income over

7. Assuming a one year gestation period, a capital to output ratio of four, and an average annual national income of about Rs. 17,000 crores during 1961 to 1971.

the ten year period. As alternatives, and assuming that the aim of policy is to increase per capita output,[8] it is 500 times better to decrease population by roughly 2 in 1,000 than it is to increase output by 4 in 1,000,000.

Even if these various estimates were cumulatively wrong by a factor of 100--which is unlikely--it would be most desirable to include some money incentives to limit family size in the Third Five Year Plan. These birth prevention schemes are probably so effective per unit of resources that they should take precedence over other programs. However, as participation by married persons may be meager at first, they should obviously be supplemented by the vastly more expensive and commonplace projects of government development plans.

IV. Some Practical Considerations

Any evaluation of government schemes to make payments for limiting family size should consider the following.

How Many Must Participate?

A minimum program in most countries is probably to bring the birth rate down at least as fast as the declining death rate. However such a reduction is less than that needed to attain an "optimum" number of births in most countries now overpopulated. In order to halve the birth rate over the next 10 to 15 years in India, it would require participation in these schemes of 5 additional adults (not yet beyond their peak fertility) each year in every community of 1,000 people. At least half of these participants would have to be men.

Where Does The Money Come From?

Even though the payment of the money may be a transfer payment, involving no loss of resources in return, government must obtain the money. If it raises these funds by printing money, or securing extra bank credit, will not the scheme be inflationary? Alternatively, may not government take the money from expenditures on ordinary development projects?

It is contended here that government can raise the necessary payments from taxes that would not otherwise be devoted to traditional development projects.

Assume that participation, during ten years in a country like India, results in ten million fewer births. If the bonus scheme were ever this popular, the average bonus might be cut to half the maximum that the economy can afford to pay, so the total cost might be Rs. 250 crores. During the 'sixties, in India, such a sum would be roughly .0015 of national income and .012 of total government expenditures. This hardly seems an inflationary threat even if the amount came from deficit financing.

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8. Until at least some minimum per capita income has been attained.

It should be quite possible to cover these sums from additional tax receipts. During the Second Plan, tax receipts of Indian governments have increased by about . 2; and it has been frequently proposed that they be increased again by about the same amount during the Third Plan. A total increase of . 4 over ten years is about 33 times the tax increase needed to pay bonuses at half the maximum scale.

There are some who may fear that every dollar spent on bonuses may be diverted from traditional development projects. If so--which is hard to conceive--the resource cost of the bonus is then at least equal to the money cost of Rs. 250 crores. The advantage of investing resources in reducing population, as against increasing production, is then "only" a factor of ten times. Actually the Indian record, since Independence, shows that only about . 15 of every extra rupee of tax receipts has gone into extra development expenditures.

What Are Some Of The Alternatives?

In countries that are already overpopulated, and have crude population increases of 2 percent a year, there may not be time to wait for uncertain birth reductions following urbanization, emancipation of women, and a delayed recognition that falling death rates have reduced the number of infants a couple must have to obtain a given size family of grown children.

The minimum age of marriage for men and women has been raised already in most overpopulated countries where marriage is a legal or religious institution.

The knowledge and availability of contraceptives can be increased by government action. But the ability rather than the willingness to limit family size is affected thereby. Even a contraceptive pill is no panacea for the same reason. It may benefit "emerging" urban parents but not untutored rural peasants. And, even if the pill cost only 10 cents, the total resource cost over the fertile period of a woman's life would exceed $100. So money payments to men and women to constrain family size--in the ways described here--may be far more effective a limitation and much cheaper in resources. Schemes of this kind may do more for suffering humanity than successful medical research on contraceptives. They constitute a social invention by economists.

INDUSTRIAL ENTREPRENEURSHIP IN TURKEY: ORIGINS AND GROWTH*

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Northwestern University

The scarcity of entrepreneurial resources in underdeveloped countries is generally recognized as a fundamental obstacle to economic progress. A study of the growth of entrepreneurial capacities, as it has occurred in some of these economies, can throw light on a social process which is as important as it is complex. This paper presents a case study of the origins and growth of the industrial entrepreneurial group in Turkey. The emergence of this group is recent and its growth has been rapid. Viewed against the background of Turkey's history and culture, its presence constitutes a truly revolutionary development. The main findings of this study are based on a survey conducted for the purpose of ascertaining the socio-occupational origins of Turkish industrialists.

I. Background

Since the establishment of the Republic in 1923, the Turkish economy and society have undergone great changes. These followed centuries of feudalistic Ottoman rule, and were initiated by a series of social reforms during the 1920's and early 1930's and by government policies designed to promote industrial development. At first, the new state relied upon a policy of encouragement to private enterprise.[1] As the Turkish entrepreneurial class was still in its infancy, the results of this policy were disappointing. Impatience with the slow pace of economic development, the impact of the world depression, and the receptivity of Turkish officials to schemes involving government control induced the Turkish government to embark in 1934 upon a policy of industrialization directly through the establishment of state-owned enterprises. The new economic policy known as etatism became part of the philosophy of Kemal Ataturk's Republican People's Party and remained the government's official policy until 1950. In that year, the Democratic Party, originally a splinter group from the Republican People's Party, was elected to power after pledging itself to a policy of encouragement of private enterprise and retreat from etatism. Since the late 1940's Turkey has entered upon a new phase of rapid industrialization and social change. The rapid growth of the Turkish industrial entrepreneurial group has been one of the most significant features of this period.

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* The author wishes to express his appreciation to the Ford Foundation for a fellowship which made this study possible.

1. For bibliography on Turkish economic conditions and policies since 1923 see A. P. Alexander, "Turkish Economic Development," in Irma Adelman and Adam Pepelassis, eds., Economic Development, New York, Harper Bros., to be published in 1960.

The weakness of the Turkish entrepreneurial resources during the earlier days of the Republic was the result of social and cultural conditions inherited from the period of the Ottoman regime. The Turks of the Ottoman Empire were contemptuous of business and of those who engaged in it and had practically left this field under the control of the foreign ethnic and religious minorities.[2] Probably 80% of commerce, finance and the existing small industry was in the hands of Greeks and Armenians, many of whom profited by freedom from military service and remission of taxes under the system of capitulations. The positions held in high social esteem were those of the government administrators, military officers, large landowners and church officials. The peasantry, representing the great mass of the Turkish people, was at the base of a largely closed social structure. The decline of the foreign minorities, the final phase of which was the exchange of populations with Greece in the 1920's, deprived the country of its main sources of entrepreneurial skills and capital. Yet it was only a couple of decades later that there began to be an upsurge in private industrial activity. The growth of private industry, already noticeable during the last two years of the Republican regime, was accelerated after 1950 under a politically more favorable environment.[3] The Turkish entrepreneurial group had grown from an almost non-existent entity in 1923 to a major social group. Its presence contributed to the liberalizing influences reflected in the political change of 1950 and, since then, it has become a major factor in the quickened tempo of Turkish economic development.

II. Socio-Occupational Origins of Turkish Industrialists

A survey was conducted for the purpose of ascertaining the sources from which Turkish industrialists were recruited. (See Appendix for more detailed information.)

Procedure

The survey was carried out in the Aegean Region which consists of a 50-100 mile wide zone along the Aegean coast of Turkey. About one-fourth of the total Turkish private industrial activity is located in this area. The importance

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2. Robert Kerwin, "Private Enterprise in Turkish Industrial Development," Middle East Journal, Vol. V, No. 1. International bank for Reconstruction and Development, The Economy of Turkey, Baltimore, Johns Hopkins Press, 1951. Eliot Mears, Modern Turkey, Macmillan Co., New York, 1924, esp. Chs. II and XV.

3. In 1950 there were 2,515 private manufacturing establishments using more than 10 horse-power and/or employing more than 10 workers. In 1955 there were 4,106 such establishments. Workers employed by these establishments rose from 87,000 to 140,000. Central Statistical Office, Monthly Bulletin of Statistics, No. 42, 43, Ankara. In 1950 there were only three new joint stock and limited companies with a total capital of 1.4 million Turkish liras. In 1954 the number of such new companies rose to 56 with a capital of 167 million Turkish liras. Ministry of Economy and Commerce, Ankara.

of this area's industrial activity is second only to that of Istanbul. The Mediterranean climate favors the cultivation of various commercial crops and the dominant city of the region, Izmir, is a major export center. About one-third of the country's food industries are found in this area. Private industry in this region has expanded at least as rapidly as in the country as a whole.

For the purpose of the survey, a stratified random sample of 68 industrialists was selected out of a total number of 380, who (a) became industrialists after 1940, and (b) were employing 10 or more workers. The stratification was based upon types of industry and size of enterprise owned. Enterprise sizes were divided into two groups: those employing 10-49 workers, and those employing 50 or more. A questionnaire designed to determine the main economic activities of the industrialists before their entry into industry was mailed to each member of the sample. Answers were received from a little less than half the sample. Those who failed to respond were interviewed personally by the writer. Some of the respondents who had returned the questionnaire were also interviewed. It was not possible to elicit answers from two members of the sample. In addition, three other members were dropped from the sample, either because they had gone out of business, or because their firms proved to be too small to be included. Thus, it was possible to utilize 63 answers out of the original sample of 68.

Findings

Table 1 shows the different occupations in which the industrialists were engaged preceding their entry into industry. "Preceding Occupation" should be interpreted to mean that main type of economic activity, preceding that of industrialist, which was largely instrumental in enabling the respondents to effect their transition into the field of industry. About 26 percent (weighted) of those in the sample had been engaged in no occupation before their entry into industry. In these cases, their fathers' occupations were assumed to be their "Preceding Occupation."[4] The fathers of 8.3 percent of the members of the sample had already been in industry and are listed as such in Table 1.

It follows from this table that traders were the most important single group from which industrialists were recruited. About four-fifths of former traders found in the sample had been previously engaged in wholesale trading, and the remainder in retail trade or importing. The presence of a merchant class in Turkey, of a size and strength sufficient to become the major source of recruitment of the rapidly rising industrial entrepreneurial group, is a recent historical development. Some of the main circumstances which have contributed to the emergence of this group will be examined in Section III of this paper.

Farmers, along with craftsmen and skilled workers, were second in rank as sources of recruitment of industrial entrepreneurs, each of these two groups being of roughly equal importance. All those in the sample who were previously

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4. The validity of this assumption was borne out by the interviews. This point is further elaborated in the Appendix.

Table 1. Preceding Occupation of Industrialists

	Percentages*	Raw data, Unweighted
Farmer	19.4 ± 9.3	9
Craftsman, Skilled Worker	17.3 ± 8.5	11
Trader	43.0 ± 13.9	32
Industrialist (Father's Occupation)	8.3 ± 6.5	6
Other	12.0	5
	100.0	63

* These results were derived after (a) both sample and population were corrected for changes indicated by the replies (e.g. some of the replies indicated a size of enterprise different from that which had originally been assumed), (b) sample results were weighted in each stratum to allow for the fact that different sample proportions had been selected from the different population strata, and (c) a confidence interval was constructed for the proportion of individuals found in the sample to be in each preceding occupation, calculated with a coefficient of .9. (See Appendix.)

engaged in farming operated holdings ranging in size from a little over 10 hectares to several hundred hectares. All former farmers in the sample thus originated from among the 16 percent of the nation's largest farmers.[5] Further, about nine-tenths of the former farmers in the sample had been owner-farmers. This proportion does not differ greatly from that prevailing in Turkey as a whole: about 73 percent of Turkish farm families own the land they cultivate while most of the remainder own at least part of the land they cultivate.[6]

Turkey has a long tradition of handicraft production. Handicrafts had especially flourished prior to the large imports of manufactured goods from the West which began in the early nineteenth century under the regime of capitulations.[7] With few exceptions, craftsmen had continued to be the only producers of manufactures until the industrialization drive of the 1930's. Even today handicraft production continues to play an important role in the Turkish economy. Articles processed include textiles and various types of wood, metal and leather products. As shown in Table 1, craftsmen and skilled workers furnished a part of the supply of industrial entrepreneurial skills and capital.

5. Central Statistical Office, 1952 Fall Survey, Statistical Resumés, No. 12/s:1, Ankara, 1953.

6. Central Statistical Office, 1950 Census of Agriculture, Ankara.

7. O. Conker, and E. Witmeur, Rédréssment Economique et Industrialisation de la Nouvelle Turquie, Paris, 1937.

At least half of the industrialists who were recruited from the "Other" preceding occupations came from such highly trained professions as engineering or chemistry. Their relative importance in the total sample, however, is very small.

Table 2 shows the relationship between preceding occupation and the size of present industrial enterprise for the sample examined. No former craftsmen and skilled workers were found to own enterprises employing 50 or more workers. In contrast, 18.2 percent of former farmers, 29.2 percent of former traders, and 33.5 percent of those whose fathers had already been industrialists, owned the larger sized enterprises. Availability of capital resources, accumulated in the various preceding occupations, is probably the major reason for this ranking. No confidence interval has been constructed as in Table 1. Whether the same ranking prevails in the population as in the sample cannot be stated with any certainty. There would, however, be nothing surprising about such a relationship.

Table 2. Main Type of Economic Activity Preceding Entry into Industry, and Size of Present Industrial Enterprise

(In percentages)*

	10-49 Workers	50 Workers and Up	Total
(Large) Farmer	81.8	18.2	100.0
Craftsman, Skilled Worker	100.0	00.0	100.0
Trader	70.8	29.2	100.0
Industrialist (Father's Occupation)	66.5	33.5	100.0
Other	96.3	3.7	100.0
Total	80.7	19.3	100.0

* See footnote to Table 1, (a) and (b).

Finally, Table 3 relates the preceding occupation with the type of industry in which industrialists are now engaged. Because of the very small number of cases in most of the strata the value of this table is very limited. Nevertheless, at least one interesting observation can be made. In contrast to those originating in other preceding occupations, former farmers in the sample have gone into only one type of industry, namely, agricultural product processing. It is highly probable, therefore, that in the total population only a small proportion of former farmers have moved into any of the other types of industries. It is also worth mentioning that in the course of the survey it was realized that the presence of former craftsmen and skilled workers in the metal, wood, etc. industries (column 2) typically reflected the transition from a former employee or independent craftsman to an employer status in the same type of industry.

Table 3. Preceding Occupation and Present Type of Industry (Raw data, unweighted)

	(1) Industries Processing Agricultural Products[a]	(2) Metal, Wood Rubber, Leather Products	(3) Earth Products[b]	(4) Textiles	(5) Paper	(6) Total
Farmer	9					9
Craftsman Skilled Worker	3	7		1		11
Trader	16	5	4	5	2	32
Industrialist (Father's Occupation)	5	1				6
Other	3		1	1		5
Total	36	13	5	7	2	63

a. Olive oil and by-products, other food industries, cotton ginning.
b. Cements, bricks, tile.

To what extent are the socio-occupational origins of industrial entrepreneurs in the Aegean Region typical of the origins of industrialists in the country as a whole? There is good reason to believe that for the country as a whole the proportion of former traders among industrialists is at least as high as that which was disclosed by the geographically limited survey. The biggest single concentration of private industrial activity in Turkey is in and around Istanbul. Almost one-half of all private industrial establishments are located in this area.[8] The potential sources from which industrialists could have been recruited in this area, compared to the potential sources in the Aegean Region, decisively favor trade at the expense of farming. Istanbul has a more strongly commercial character than any major center in Turkey and the largest community of traders is to be found in this city. There is no reason to suppose that Istanbul traders have been less eager to become industrialists than their counterpart in the Aegean Region. On the other hand, commercial farming in the northwestern section of the country is relatively not as important as in the Aegean Region. Both the absolute number and the proportion of holdings larger than 10 hectares (from which all former farmers in the Aegean Region had originated) is much smaller here than in the Aegean Region.[9] Further, the survey in the Aegean Region has disclosed that few, if any, former farmers moved into industries other than those processing agricultural products, which are chiefly food processing industries. That the proportion of former farmers

8. Union of Chambers of Commerce, Industry and Commodity Exchanges of Turkey, Economic Report, Ankara, May 1955.

9. Central Statistical Office, Ankara.

may be smaller among Istanbul industrialists may also be suggested by the fact that only one-tenth of industrial establishments in the Istanbul area process food and allied products, compared to about one-third in the Aegean Region. Whether the proportion of the other various preceding occupations is also different among Istanbul industrialists is even more difficult to guess.

The remainder, roughly one-fourth, of private industrial establishments are scattered throughout the country with a high proportion of them located along the other coastal areas of Turkey. Chief among these areas is Adana in the Southeast. Like most of the other coastal areas, Adana is similar to the Aegean Region in terms of economic activities and occupational structure. In the absence of any other evidence, there is no reason to believe that the pattern of recruitment there is different from that in the Aegean Region.

In conclusion, considering the relative importance of Istanbul as an industrial center, it appears very likely that for the country as a whole, the proportion of former traders among industrialists is at least as high as that found among industrialists in the Aegean Region.

III. The Growth of Turkish Entrepreneurship

The prominence of former traders among Turkish industrialists underscores the significance of a pre-industrial, commercial phase in the evolution of Turkish entrepreneurship. It is noteworthy that the period of commercial incubation of industrial entrepreneurship has been relatively short. A merchant class as a significant social force (other than the foreign minorities) came into existence in Turkey for the first time only after the establishment of the Republic in 1923. The development of Turkish entrepreneurship was part of the broader change in social stratification which has occurred in Turkey since then. This change was triggered by Kemal Ataturk's social reforms and has since gathered momentum.[10]

The broad pattern of the evolution of Turkish entrepreneurship will first be briefly outlined. Under the impact of the Kemalist reforms there was a decline in the position and influence of the groups traditionally comprising the Ottoman aristocracy. At the same time, new social groups began to be formed in response to changing needs and opportunities. The latter groups included a growing merchant class, professional and other middle class elements. The decline of the entreprising foreign minorities was also completed early in this period. With the peasantry remaining at the base of the social ladder, the emerging social structure was the result of the blending of survivals from the traditional with the newly rising groups. Towards the end of the 1940's, and especially after the political change in 1950, members of the fast growing merchant group, and to a lesser extent large landowners and craftsmen, began to

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10. Studies of the social reforms under the new Turkish regime include: H. E. Allen, The Turkish Transformation, Chicago, University of Chicago Press, 1935; G. Lewis, Turkey, London, Ernest Benn Ltd., 1955; J. Parker and C. Smith, Modern Turkey, London, 1940; B. Ward, Turkey, London, Oxford University Press, 1942; D. E. Webster, The Turkey of Ataturk, Philadelphia, 1939.

swell the ranks of industrial entrepreneurs. But the sustained rise of private industry, and further economic development in general, were being increasingly blocked during the mid 1950's by an acute foreign exchange shortage. This pattern will now be examined in a little greater detail. [11]

During the Ottoman period, the great landowners, military officers and religious leaders had derived much of their power through the positions they held in civil government. Under the Republic, the criteria of eligibility for civil service positions changed. [12] Loyalty to Kemal Ataturk's party and to the principles of the Republic became an essential requirement for holding important government positions. New responsibilities were assumed by the administrative machinery and efforts were made to create a professional civil service group. Ataturk fought successfully against the religious leaders, the state and education were secularized and the new corps of military officers was eventually confined to its military functions.

Combined with the declining importance of traditional careers, alternative opportunities opened up as the new regime turned its efforts toward economic development and modernization. With an increasing demand for various types of specialized services, professions gradually began to carry the authority of superior knowledge in lieu of superior position. [13]

Greater opportunities for training were available in the country's expanded educational facilities and individuals were encouraged and aided to study abroad. Turkish nationals also began to be increasingly attracted to business careers in an environment of expanding economic opportunities for profit and of social change.

Profit opportunities became available in the vacuum created by the decline of the foreign minorities. This development, while depriving the country of important entrepreneurial resources, also removed the competition of groups which had enjoyed the advantages of long business experience and a secular education.

New opportunities also arose during the Second World War. While remaining neutral Turkey experienced severe inflation (the price level rose four to five times between 1938 and 1945) and shortages. Competitive buying by the belligerents, a decline in imports of consumer goods, defense expenditures and

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11. Available sources deal only incidentally with the growth of entrepreneurship in Turkey. The present brief historical reconstruction has had the additional benefits of the survey findings and the interpretations and experiences of entrepreneurs communicated to the writer in the course of the interviews.

12. A short analysis of Turkish bureaucracy is given in H. V. Cooke, Challenge and Response in the Middle East, New York, 1952, pp. 281-282.

13. Eleanor Bisbee, The New Turks: Pioneers of the Republic, 1920-1950, University of Pennsylvania Press, 1951, Ch. 9.

manpower mobilization, largely account for these conditions.[14] A deceptive wartime prosperity resulted in the accumulation of large profits in commercial hands. Trading in foodstuffs and raw materials was a particularly large source of profits.[15] Speculation and high profits also contributed to a greater "money-mindedness" among existing and potential businessmen.

A particular development should also be mentioned. Many commercial establishments in Istanbul were (and still are) owned by members of minority groups who had not been affected by the population exchanges or expulsions. But their share of business has been continuously decreasing. A capital levy (Varlik Vergisi) in 1942 fell heavily on these groups, with ruinous effects for many of their members. This levy was instrumental in the further Turkofication of economic life by enabling Turks to buy up, at very low prices, the businesses and property of members of minority groups.[16]

Additional profit opportunities developed in the course of the rapid economic expansion which began in the late 1940's. Industrial production doubled between 1948 and 1955 and agricultural production increased by close to 40 percent between 1948 and 1953, levelling off since then.[17] Profits in commercial activities increased in an environment of rising output, higher and more diversified demand, and a greatly expanded sphere of monetary exchange among the rural population. Importing, particularly during the brief period of import liberalization in 1950-1952, was also highly profitable. (Imports almost doubled between 1950 and 1952.) Rising prices and increasing shortages after 1953 further contributed to commercial profits. Profits in commercial agriculture also rose as a result of the high volume of production, the government's high price support policies, tax favoritism and cheap credit.[18] Larger farmers, better able to expand their marketable surpluses, especially profited from these agricultural policies. Among the sample of industrial entrepreneurs examined, cases were cited of former traders (including importers) and large farmers whose substantial profits during this boom period were immediately reinvested in industry, especially during 1953 and 1954.

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14. Eric Lingeman, Turkey: Economic and Commercial Conditions, London, H. M. Stationary Office, 1948, Ch. I and II. See also footnote 1 above.

15. In a reference to Turkey, Charles Kindleberger mentions that the Turkish industrial leaders were drawn from the merchants who piled up profits from trading in chrome and dried fruits during the Second World War. Economic Development, McGraw Hill Book Co., 1958, p. 86.

16. Charles Issawi, "The Entrepreneur Class," in S. H. Fisher, ed., Social Forces in the Middle East, Cornell University Press, 1955.

17. Organization for European Economic Cooperation (O.E.E.C.), Statistical Bulletin, General Statistics, Paris, January, 1957.

18. For a discussion of these policies, see W. H. Nicholls, "Investment in Agriculture in Underdeveloped Countries," American Economic Review, Papers and Proceedings, May 1955.

The business group, which from the late 1940's on included an increasing number of industrialists, and which had been expanded and enriched during the wartime neutrality and the subsequent economic expansion, was anxious for greater outlets for its capital and initiative than etatist policies permitted.[19] The Democratic Party, originating in a split from the People's Republican Party, became the champion of its cause. Both Republic and Democratic parties were in basic agreement by 1950 that the practice of state-run industries had been carried too far, and both promised a reversal of the trend by giving greater scope and encouragement to private enterprise. But it was the Democratic Party which was able to elicit the greatest support of other segments of the population as well.[20] The slowly growing proletariat suffered from inflated prices and a law forbidding them to strike. Workers were ready to support any party strong enough to challenge the government. Farmers were promised by the Democratic Party that its victory would mean higher prices for their products. The minorities, with the Varlik still fresh in their memories, felt that any change would be for the better. Last but not least, the religious fanatics were always ready to grasp any opportunity to undo the Kemalist reforms.

Since the establishment of the Republic, Turkey had been governed by one party. The lack of any tradition of western liberalism and the semi-feudal character of the social system inherited by the Republic almost precluded any other source. A policy of social reform and economic development was launched by an authoritarian Turkish state under an "enlightened" military despot who had won a fanatical following by virtue of his leadership in the successful nationalist war for independence. The inauguration of the policies of etatism in 1934 had to a large extent been dictated by the scarcity of the domestic resources of capital and entrepreneurship. In 1950, it was the active presence of a business community and of other middle class elements, grown largely as a result of the policies of the new regime, which became decisive factors in the political change leading towards greater economic and political liberalism.

In the absence of adequate statistics it is not easy to document the changes in the country's social stratification. Some further insight into these changes can perhaps be gained by observing the changing composition of the Turkish Parliament in terms of education and training of its members. At least the following changes are worth noting: between 1940 and 1954, the proportion of the military declined from 18 percent of the total number of the members of Parliament to 5 percent, while members trained for the various professions (engineers, doctors, lawyers and agriculturists) increased from 31 to 55 percent.[21]

Private industry grew very rapidly after 1950 (see fn. 3). The political change created conditions favoring the release of private initiative. Although the new government eventually resumed the policy of heavy investments in

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19. G. L. Lewis, op. cit., Ch. 19.

20. Ibid., Ch. 19.

21. From the biographical album of the members of the Grand National Assembly, T. B. M. M. Album, Ankara, 1940 and 1954.

industry and other sectors, private investment was also encouraged.[22] There existed now in Turkey a pool of entrepreneurial resources from which industrialists could be recruited. These entrepreneurs possessed capital accumulated largely through commercial and agricultural profits under circumstances described earlier. Additional funds were made available through the activities of the Turkish Industrial Development Bank, established in 1950.

Beginning in the late 1940's, an unprecedented expansion of domestic markets seems to have been the immediate factor which triggered the sharp increase in private industrial activity. The nature of economic development during the last decade accounts for the strength in domestic demand.

Increased investment,[23] unusually favorable weather for agriculture through 1953, improvement in the terms of trade after 1950 and U. S. aid[24] provided the major stimuli to the accelerated tempo of economic development. The most rapid rate of increase in real national income occurred during the 1948-1953 period, when it rose by about 40 percent.[25] The rapid growth, however, was accompanied by serious inflationary pressures and balance of payments difficulties.[26] The inflationary gap has been traced to the attempt to both invest and consume more resources than could be made available from domestic sources and the import surplus.[27] A major factor contributing to the rise in consumption demand was the inability to save out of substantially increased agricultural incomes. Higher agricultural incomes were the result of increased productivity and artificially high prices for agricultural commodities.

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22. Investors could now act without the fear of arbitrary government intervention. It had been this fear rather than legal restrictions which had interfered with their decisions during the period of etatism. See Max Thornburg, Turkey: An Economic Analysis, New York, The Twentieth Century Fund, 1949. It is worth noting that under the strong sellers' market prevailing in the 1950's, competition between the private and state sectors did not become a serious problem.

23. Investment rose from 8.3 percent of gross national product in 1948 to 14.5 percent in 1954. Data supplied by OEEC, Paris.

24. U. S. economic aid to Turkey from 1948 to 1955 amounted to $566 million. International Cooperation Administration, Ankara.

25. Central Statistical Office, Monthly Bulletin of Statistics, No. 30, August 1956.

26. The wholesale price index, rising slowly after 1948, increased by at least 25 percent between 1953 and 1956. Central Statistical Office, Ankara, Monthly Bulletin of Statistics, Ankara, January, 1957. The substantial balance of trade deficits had resulted by 1958 in the accumulation of about $200 million in foreign commercial arrears. International Cooperation Administration, Ankara.

27. H. B. Chennery, G. Brandow, and E. Cohn, Turkish Investment and Economic Development, F. O. A., Ankara, December 1953.

The improved conditions of the mass of small Turkish farmers during these years was the result of spending on consumption of most, if not all, of their increased incomes. A partial breakdown of the economic and cultural isolation of large areas in interior Anatolia and the exposure of Turkish farmers to urban consumption patterns also contributed to the desire to consume. Little was done by the government to control consumption as even the wealthiest of Turkish farmers pay only nominal taxes. The boom in the domestic consumption industries during these years was to a large extent based upon the expansion of these markets. Import restrictions of consumer goods, tightened after 1953, contributed to the inflationary pressures and shortages while insulating domestic producers from foreign competition. With rising domestic prices and a dramatic decline in the value of the Turkish lira, importation of new investment goods was highly rewarding. Under these conditions, industrial profits were very high.

The growing shortage of foreign exchange, however, eventually rendered the importation of investment goods difficult or impossible. Foreign exchange shortage became the main limitational factor to the growth of private industry in Turkey and to sustained economic development in general. By 1955, several industries dependent upon imported raw materials or in need of spare parts had been forced to curtail their operations. Among the industries hardest hit were woolen textiles, rubber processing, metal working, chemicals and plastics. Foreign exchange resources had fallen short of that level necessary for the productive utilization of such domestic savings as were available at that time.

IV. Summary

The single most important group from which Turkish industrialists were recruited were traders. Larger farmers and craftsmen were second in rank as sources of recruitment, each of these two groups being of roughly equal importance. Most, if not all, of former farmers have moved into industries processing agricultural products. In contrast, former traders have shown no strong preference for particular types of industries. It was found that several former craftsmen have become "industrialists" by simply expanding their scale of operations in the same type of manufacturing activity. Second generation industrialists, traders, farmers, and former craftsmen tend to own larger industrial enterprises, in that order.

The rise of industrial entrepreneurship in Turkey was the climax of a series of economic and social changes compressed within the period since 1923. Prior to that time Turkish society had for centuries experienced little change. An important ingredient of the changes which followed was the rise of commercialism. The declining importance of traditional careers, opportunities in business and the professions in a society undergoing modernization and development, and the impact of the radical secularizing and westernizing reforms of the new state all contributed to the rise of the spirit of enterprise. The recent venture of private entrepreneurs into the field of industry had been preceded by a social experience which had strengthened the attributes of rationalism and the desire for material profit, and by an economic experience which had contributed to the accumulation of capital in private hands.

The role of the state was of paramount importance. It was radical state action which shook the Turkish society loose from the dead weight of its traditions. This was a revolution in social organization and cultural values imposed from above, often ruthlessly, upon a traditional peasant society. The state undertook the first serious steps towards industrialization. Before too long, however, a rapidly changing Turkish society found itself in conflict with the all-embracing activities of the state. Business and other groups, grown under the new regime, had now much to gain by greater freedom from state interference. This was the meaning of the liberalizing political change of 1950. Since then, favored by economic and political conditions, private industry has grown rapidly.

It is noteworthy that the leader and founder of the new state was a military man who rode to power on the wave of nationalism he helped to arouse. This is not unlike the more recent experience of some other countries in the Middle East and elsewhere. Military men have often broken their alliance with the old order to spearhead the twin movements of nationalism and social reform. If an analogy may be drawn between Turkey and these other countries, one is perhaps justified in expecting that the latter may also eventually move in the direction of greater economic and political liberalism.

APPENDIX

Additional Information on Survey Methods and Data*

The original population and sample of industrialists, stratified by type of industry and size of enterprise owned, is shown in Table 4. Most enterprises were single proprietorships. In the cases of other forms of business organization, it was always possible to locate one person holding a majority interest in the enterprise. This person was considered the entrepreneur.

As noted earlier, more than half of the respondents were interviewed personally, while the remainder had answered a mailed questionnaire. An effort was made to keep the questionnaire as short and simple as possible. The effectiveness of the questionnaire in eliciting the desired information was verified in the course of the interviews.

The following questions were asked:

1. Number of workers employed.
2. Product(s) produced.

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* The writer is indebted to the Chamber of Industry of the Aegean Region for providing him with information on the population of entrepreneurs as well as for other valuable assistance.

3. What was your father's occupation?

4. What was your occupation when you first began making a living?

5. What was your occupation just before your present one?

6. In which occupation, preceding your present one, had you been financially most successful?

Questions 1 and 2 were designed to check the information about the respondents' type of industry and size of enterprise which had been obtained from the records of the Chamber of Industry. Some discrepancies were found and appropriate corrections were made in the sample. On the basis of the new sample some corrections were also made in the population.[a] Table 5 shows the corrected population and sample.

Instructions were given to respondents in answering questions 3-6. For example, sample-members whose preceding occupation was that of farmer were asked to state the size of the land they operated, and whether they had been tenants or owners. To make answers by different respondents to questions 3-6 comparable, a list of 21 occupations was provided with instructions to the respondents to refer to it in their answers. On the basis of the answers to questions 3-6 it was possible to reconstruct the broad pattern of the respondents' backgrounds.

Fifteen of the respondents reported that they had no occupation preceding their present one as industrialists. The "Preceding Occupation" was then considered to be that of their father. This was based on the assumption that the respondents who had no previous occupation received from their fathers at least a large part of the financial resources which enabled them to become industrialists. The capital invested in the son's industrial enterprise was considered to have been accumulated in the father's occupation. Of the 15 respondents in this category, 7 were among those interviewed personally and it was found in all cases that their parents' economic assistance was instrumental in their entry into industry. It was also found that the fathers of 5 of the 15 had already been industrialists.

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a. The corrections were the following: (1) It was found that 3 out of 30 sample members in the B-size strata had gone out of business. The change was considered large enough to represent a significant trend. Accordingly, a 10 percent downward adjustment was made in all B-size strata of the population. The adjustment affected all industries proportionately, since there was no reason to believe that any one industry was more prone to such a decrease. (2) A few corrections were made in the population for apparent misclassifications in the records of the Chamber of Industry and which were discovered in the sample examined. The corrections were not proportional since it was felt that the cases involved did not represent any particular trend. (3) The corrected sample also reflects the fact that it was not possible to elicit answers from 2 of its members. Of course, no corresponding adjustments were made in the population for this correction.

On the whole, the remaining 48 respondents listed the same occupation in answering questions 5 and 6; in many cases the same occupation was cited in questions 4, 5, and 6. In only 2 cases were different occupations mentioned in each of the three questions. This reflected a tendency for the sample-members to have concentrated in one type of occupation before becoming industrialists, and to have raised most of their capital in the same occupation. In the two cases where the occupational background was more varied, the answer to question 6 was found, on the basis of personal interviews, to be the most indicative of the main "Preceding Occupation."

On the basis of the respondents' answers to these questions, Table 6 was constructed. These results were weighted because different sample proportions had been selected from the different population strata (as can be seen in Table 5). The results of weighting, in percentage terms, were presented in condensed forms in Tables 1 and 2 (main text). Table 3 presents the raw unweighted data of Table 6 in condensed form (columns 1 and 2 of Table 3 correspond to columns a + b + c and d + e + f of Table 6, respectively).

Table 1 includes a confidence interval constructed by the use of the "t" test.[b] The calculations involved are too extensive and detailed to be included here. However, all information essential to these calculations has been included. This information consists of the following:

1. The corrected sample and population, given in Table 5.

2. The actual number of entrepreneurs in the sample in each type of industry who were previously engaged in a given occupation. This information is given in Table 6.

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b. See W. G. Cochran, Sampling Techniques, John Wiley & Sons, 1953, pp. 72-72.

Table 4. Original Population (P) and Sample (S) of Industrialists by Type of Industry and Size* of Enterprise Owned

	Olive Oil		Other Food		Cotton Ginning		Rubber, Leather		Wood		Metal		Earth Products		Textiles		Paper		Total	
	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S
Size A	89	10	62	6	57	5	8	3	12	3	25	4	31	3	12	2	2	2	298	38
Size B	13	5	14	4	28	4	3	3	3	3	3	1	9	3	9	7	0	0	82	30
Total	102	15	76	10	85	9	11	6	15	6	28	5	40	6	21	9	2	2	380	68

*Size "A" enterprises employ 10-49 workers; size "B" enterprises employ 50 or more.

Table 5. Corrected Population (P) and Sample (S) of Industrialists by Type of Industry and Size* of Enterprise Owned

	Olive Oil		Other Food		Cotton Ginning		Rubber, Leather		Wood		Metal		Earth Products		Textiles		Paper		Total	
	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S	P	S
Size A	89.0	9	62.0	7	58.0	6	8.0	5	12.0	2	25.0	4	30.0	2	12.0	2	2.0	2	298.0	39
Size B	11.7	6	13.5	4	25.2	4	2.7	1	1.8	1	2.7	0	8.1	3	8.1	5	0.0	0	73.8	24
Total	100.7	15	75.5	11	83.2	10	10.7	6	13.8	3	27.7	4	38.1	5	20.1	7	2.0	2	371.8	63

*Size "A" enterprises employ 10-49 workers; size "B" enterprises employ 50 or more.

Table 6. Preceding Occupation and Present Type of Industry

(Raw Data, Unweighted)

Preceding Occupation	Present Type and Size of Industry									
	(a) Olive Oil	(b) Other Food	(c) Cotton Ginning	(d) Rubber, Leather	(e) Wood	(f) Metal	(g) Earth Products	(h) Textiles	(j) Paper	Total
Farmer										
*Size A	3		3							6
Size B		2	1							3
Craftsman Skilled Worker										
Size A	1	1	1	3	1	3		1		11
Size B										
Trader										
Size A	3	3	2	1	1	1	1	1	2	15
Size B	4	2	2	1	1		3	4		17
Industrialist (Father's Occupation)										
Size A	1	1		1						3
Size B	2		1							3
Other										
Size A	1	2					1			4
Size B								1		1
Total	15	11	10	6	3	4	5	7	2	63

*Size "A" enterprises employ 10-49 workers; size "B" enterprises employ 50 or more.

SOCIAL INTEGRATION AND CHANGE IN TWENTY-FOUR MEXICAN VILLAGES*

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A previous paper entitled "Two Determinants of Community Reaction to Industrialization in Rural Mexico"[1] reported the findings of the first step of a larger study of community integration and industrialization. In that report the phrase "community reaction" was intentionally used to avoid suggesting that the villages that maintained economic contact with a new factory center in the region had necessarily changed. However, it is a logical next step to inquire whether such contact does lead to change, or, if not, what are the alternative factors. In posing this question, the present paper becomes a sequel to the first.

The new industrial center mentioned above may be said to have begun in 1950 in what is one of the poorest states of the Central Plateau of Mexico. In 1958, the year of the research here reported, it consisted of four industries and some 6,000 people situated on a high plain that had once grown thousands of maguey plants. Bordering this plain were the villages and haciendas that had formerly depended entirely on the profits of pulque (a native beer). However, with the general disorganization following the revolution, the post-revolutionary subdivision of the land into units too small for profitable management of such an essentially plantation crop, and the decline of demand for pulque, the villages have experienced extreme poverty. Consequently, they have welcomed the new factories as a means of repairing the regional economy. The communities seek change voluntarily, even eagerly, and although there are occasional complaints of "coercion," it could not be considered "imposed" change.

However, in at least one respect the "contact situation" is rather unique since the factories were expressly placed in this area in order to stimulate change. The state and national governments are also influencing this particular region, bringing about a situation of pervasive innovation. The only accurate description is that the region as a whole is changing as a result of the influence of the national economy.

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* This paper is based on material collected during 1957-1958 and supported by the Doherty Foundation and PHS Grant #MF-7818-C.

1. F. Young and R. C. Young, "Two Determinants of Community Reaction to Industrialization in Mexico," this journal, Vol. VIII, No. 3, pp. 257-264.

The twenty-four villages treated here lie within a zone of immediate influence of the factory center and constitute the universe of autonomous communities. As a forthcoming paper will show, they tend to form an inter-village system, in that these villages have more interaction among themselves than with communities outside the region. The median size is 360 people, while the largest town has a population of 6,567.

The determinants of contact with the industrial center, as reported in the first paper, were a population of over 1,000 people and a location of within five miles of the factories. The population cutting point was shown to correspond to a level of institutionalization that put the community into communication with the main stream of national change, while proximity to the factory center was functional distance, as defined by the condition of the roads. These two variables in combination predicted the economic contact--as measured by an eight step Guttman scale--of all but two of the twenty-four villages. The explanation advanced for this relation turned on the importance of community institutions in helping the members to make contact with the factory center, whether for work, commercial relations, or in order to petition for community aid. However, if the community were deficient in institutional resources, it could still make contact if it were located near enough to the factories so that individuals could seek employment on their own.

Given these findings, there was reason to believe that "contact" would predict the social changes that some of the communities had experienced. Since the literature on social change makes contact nearly synonomous with change, and since one of the items of the scale of contact was "village has received aid from industrial center," we expected a relation almost by definition. On the other hand, if the proposition "contact leads to change" means anything at all, it means that contact has this effect independent of other determinants. Accordingly we controlled out such factors (principally "institutional level") when we made the test, with the result that no relation between economic contact and change remained. Contact with the factory center has undoubtedly raised the level of change in this whole region, but it does not predict the particular communities that have changed the most. The implication is that a community will not change, even if brought into contact with a potential source of change, unless it has a capacity for it. So stated, one immediately thinks of the many peasant communities which, despite exhaustive attempts to reach them, have not caught the spark that fires them to "community development."

If contact does not lead to change, what does? Before presenting our findings on this question, the problem of defining change requires a preliminary hearing. The type of change of interest here is, first, group-level change. The empirical measures detailed below make use of innovations like bridges, schools, changes in the local government, etc., and not the acquisition of bicycles or health practices. Second, the changes must have occurred between 1950 and 1958, that is, the initial years of rapid industrialization and the period for which accurate data are available. But most important is the division of change into two types: absolute and relative. The first type is the actual number of group-level changes from any source that have occurred in a village during the eight year period. The second is the difference between the community's level of institutionalization in 1950 and 1958. Although a change of the second type assumes a change of the first type, there need not be in theory and there is not in fact a correlation between the two. The reason for this is

that in addition to absolute changes, a community's relative position depends on the total change of the region and the advances or regressions of its peer communities. Absolute change reflects the community's ability to get things for its own use, while relative change reflects its ability (and the play of circumstances) relevant to its progress vis-à-vis the others. And, we will be seen, the determinants of the two types of change are different.

Method

The background and design of the larger study on which this paper is based has been reported elsewhere.[2] Briefly put, it was a year-long investigation of community integration and its relation to the reception of industrialization, the amount and kind of subsequent group-level change, and the resultant effects on the individuals of the community. Since we could not be sure just what aspect or type of integration would prove most important, we decided to study four concepts simultaneously. They were: institutionalization, folk-urban differences, an interaction concept, and a fourth that might be labeled "lack of social pathology." Our plan involved preliminary analysis and empirical tests of these different conceptions, leading to a refined conception of "integration."

The technique used to study the integration and change in the twenty-four villages consisted of a structured questionnaire administered to the one or more official community leaders. Generally these were the commissioner of communal lands, although in large places it might be the municipal presidents, and in small places the local "judge." These officials were asked questions about their community's contact with the factory center, the institutions of the village, and such general topics as the beliefs and the level of living of the people. On the basis of these responses, the independent observations of the interviewer, and certain census data,[3] we devised indices of absolute and relative social change, institutionalization as of 1950 and 1958, urban style of life, and a measure of interaction-cohesion that we shall label "morale." The reliability of this key informant schedule will be reported in a forthcoming paper. Suffice it to say that all items used here are reliable, and many were checked against personal observations and information from other sources. The number of cases studied is small when compared to samples of individuals, but the difference is that these twenty-four villages are all the villages under study. Thus, the criterion of significance is practical rather than statistical. Moreover, we have taken as an ideal (albeit not wholly reached) the complete prediction of differences.

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2. F. Young and R. Young, "A Study of Industrial and Community Change in Rural Mexico," paper read at the April, 1959 meeting of the Southwestern Anthropological Society.

3. We are indebted to Fausto Urencio of the Bank of Mexico and to the staff of the Mexican Bureau of the Census for these special data.

The Determinants of Absolute Change

The responses of the key informants to diverse questions about changes in the village since 1950, as corroborated by the investigator's observations and general interviewing, supplied a long list of changes on which to base an index. The main categories in which such changes took place were: roads, electrification, local government (including improvements in the government building), extension of communal land, housing (for the whole village), education, railroad, church, ejido (communal land) organization, market, telephone service, stores, medical services and agriculture. The maximum number of changes reported by any community was seven. Thirteen communities reported three changes or less, and these will be classified as "low change" communities. The other eleven, with between four and seven changes, were the "high change" communities.

As a first determinant of such absolute change we turned to the scale of institutional level based on items known to be present or absent in 1950. We follow Chapin's definition of a nucleated institution: "common reciprocating attitudes of individuals and their conventionalized behavior patterns."[4] We make a second assumption, born out by previous findings in New York State communities[5] that the various nucleated institutions of a community are related in a single community social system. This has also been the assumption of theorists like Parsons and Williams[6] who have been concerned with the larger, national social system. Thus an addition of an institutional role, a meeting place, or the like is an increment to the level of institutional functioning, and to the level of functioning of the community institutional system as a whole. It has also been shown previously[7] that an important function of the community institutions is to maintain relations with the larger regional and national systems of which the community institutions are units. Consequently an important part of the growth of community institutional level is the expansion of ties with the wider regional and national institutional systems. Each item in the scale is not an entire institution, but rather represents an increment to the level of functioning of the community institutional system. This measure is shown in Table 1. The eight item Guttman scale that emerged from the 1950 data was of course much shorter and had fewer alternate items than the fifteen step scale based on the richer data of

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4. F. S. Chapin, Contemporary American Institutions, Dubuque, Iowa, 1935, pp. 13 ff.

5. R. Young, Community Structure and Individual Integration: A Test of the Group Effect Hypothesis in Neighborhoods and Formal Organizations, Ph. D. thesis, Cornell University, 1958, pp. 149 ff.

6. See T. Parsons, The Social System, Glencoe, Illinois, 1951 and R. M. Williams, Jr., American Society, New York, 1956.

7. R. Young, op. cit., pp. 172-178.

1958.[8] However, it did break the communities into two significantly different groups: those with local institutions only, and those with institutions that allowed access to urban centers and mass communications. The items characterizing the first group, from low to high, were: the locality has a name and is autonomous (i. e., not a ranch); there is an official organization (such as an ejido); there is a church; a school. The items characterizing the second group were: there is a railroad station; a plaza; a doctor; electricity. Sixteen communities fell into the first group and were designated "less institutionalized." The eight communities of the second group were considered "more institutionalized."

Table 1. Scale of Institutional Level Among Twenty-Four Rural Mexican Communities as of 1950

Scale Step #	Item Content	Proportion of 24 Villages Having Characteristic	Scale Error
1	Named and autonomous locality group	100	-
2	An official organization	96	0
3	A church	71	1
4	A school	54	1
5	A railroad station	33	2
6	A plaza	29	0
7	A doctor--eight or more stores	16	0
8	Electricity in the village	8	0

The second factor that was brought to bear in explanation of social change is "urban life-style." Operationally, this means that according to the national census of 1950, fifty percent or more of the inhabitants of the villages habitually wear shoes. The assumption that wearing shoes indexes urban life-style gains support from Whetten's[9] discussion of shoes as an important index of assimilation of Indians into the national culture of Mexico. He further states that most of the Indians living at the "Indian-colonial level" are rural residents. Hence we would expect to see more Mexican nationals who wear shoes in urban places. Indeed it is difficult to buy huaraches (sandals) in some of the larger cities

8. The items in this scale were: named and autonomous locality group; one or more governmentally designated officials; one or more organizations in village; a church; a school building; a functioning school; access to electric power; railroad station; school has four or more grades; village has a public square; doctor; one or more telephones; forty percent have radios; a secondary school. Indexes of reproducibility for the 1950 and 1958 scales are . 96 and . 98 respectively.

9. N. L. Whetten, Rural Mexico, Chicago, 1954, pp. 360-362.

today, while shoes are readily obtainable in all of the larger trade centers of the region of study. In addition to the aspect of behavior and favorable orientation toward the city suggested in the phrase "urban style of life," we believe this index taps an organizational aspect of the village, of which the occupational structure is an important part. This extension of meaning is supported by the correlation that holds in this region between habitual wearing of shoes and a relatively high proportion of nonagricultural occupations. These nonagricultural occupations include merchants, service occupations, railroad workers, etc. There was no real industrialization before 1950. Lack of data on five of the villages precluded the use of this index. By "urban style of life" we mean, then, at this level, nonagricultural occupations which are typically more directly tied in with the national economy, and correlated urban habits, such as the wearing of shoes. We assume such habits to index a sub-strata of urban ideas, aspirations, and orientations.

Institutional level had already emerged as an important factor predicting contact, and by analogous reasoning we concluded that a community with relatively great institutional resources would be able to obtain and assimilate a greater number of changes. Once a community has a school or church, for example, its chances of obtaining a bridge, a new grade in the school, electricity, etc., are increased. In other words, the amount of change to be expected will be proportional to a community's institutional base.

However, in using the concept of urban life-style to apply to the organization of what are in other respects rural communities, we have departed from traditional usage. Heretofore, urban life-style has been considered something that country people acquire as the end result of long contact with the city. Our usage assumes that these villages have already been influenced by the city and that acquired attitudes are beginning to operate as causes. This seems a legitimate extrapolation of present concepts of "peasant society" which include the presence of customary[10] relations with the city.

These two determinants--high institutional level and urban life-style--are related to absolute social change. As Table 2 shows, the two variables in combination predict the degree of change in all but four of the communities. If a community has both high institutionalization and an urban style of life it is quite likely to change; the opposite combination leads to little change. But style of life operates independently; it retards the change of one community with high institutionalization but a rural style of life, and it advances the four communities which, although less institutionalized, have an urban style of life.

The four exceptions require special consideration. The one community with a high level of institutionalization and a rural style of life which has nonetheless had high change has benefited disproportionately from its location only a short distance from a larger village. Its larger neighbor exchanged some of its land for use by the factories in return for electricity, a new well, and other improvements. The smaller village had a claim to the land, and was aggressive enough to obtain commensurate benefits. The other three exceptions must

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10. See Robert Redfield, Peasant Society and Culture, Chicago, 1956, pp. 31 ff.

Table 2. Absolute Change by Institutional Level and Urban Life-Style

	Low Change (0-3)	High Change (4-7)
More Institutionalized (Scale steps 5-8)		
Urban Life-Style (50% or more wear shoes)	-	6
Rural Life-Style	1	1
Less Institutionalized (Scale steps 1-4)		
Urban Life-Style	3	4*
Rural Life-Style	9	-

*Includes one community for which the proportion of shoes was not available. It is placed in this category because it is similar to the other three communities in other respects, as discussed in the text.

be considered in the context of all seven communities which are less institutionalized but which have an urban style of life. Three of these (the exceptions) are low changers, and four are high changers. If an urban style of life leads to change, independently of its correlation with high institutionalization, why have only four urban-style communities experienced high change? The three communities which did not change were formerly hacienda communities and are still greatly influenced by the hacienda. Specifically these populations live in the rows of stone houses formerly allotted to hacienda workers, and in some cases, they continue employment in the reduced, but still operating haciendas. These villages have ejido organizations, but they appear to lack vigor, are extremely poor and generally resourceless. In contrast, the four communities which have changed consist of groups of people who moved away from the former haciendas to which they were attached and set up new villages at some distance from the hacienda buildings. It is as if they organized themselves to move out of the shadow of the hacienda and the social structure that it represented. It is interesting that the leaders of these four progressive communities answer the question "How old is this community?" by giving the year they moved, while the leaders of the hacienda communities give the year the hacienda was built.

Thus, in addition to the determinants explicitly shown in Table 2, there is evidence that another factor is operating. The difference between the hacienda communities and the ejido communities suggests a difference in the overall community activity or spirit. Although this factor is still ill-defined empirically, we believe it corresponds to the third concept of integration used in this study. We conceive of this type of integration as primary group cohesion, characterized by a high degree of face-to-face interaction within the group, less with persons outside it, and consequently many affective ties and a community of ideas within it. The recently organized ejido communities, most of which have moved away from their original hacienda location at great cost of work and organization, have demonstrated a progressive spirit which we shall designate as "morale."[11] We assume that such morale is associated with high primary cohesion.

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11. Other characteristics of these communities which will be discussed in a later paper, support this generalization. For instance, the ejido com-

A Determinant of Relative Change

Relative social change is a shift in a community's position on some hierarchy of regional structure. In the present case, it is a shift in institutional level as measured for 1950 and 1958. The first scale has been presented in Table 1, and the second is reported in another paper.[12] A community's rank among the twenty-four was determined in conjunction with the scale rank, which indicated which communities were tied. Thus, if three communities share scale position six on the 1958 scale, and if there are six communities below them, the three must share ranks seven, eight and nine, or a mean of eight. The resultant rank combines both the scale and regional position, and the difference between a community's rank in 1950 and 1958 measures its relative change. Such a measure divides the communities into three groups: seven communities advanced two or more places; eleven changed very little; and six lost two or more places.

Urban style of life, which had previously predicted absolute change, did not explain relative change in institutional rank. A consideration of the difference between the two types of change suggests the reason for this. While urban orientation might help a community to obtain changes, something more may be required to achieve a shift in rank in relation to one's peers. Such "social mobility" might require a special impetus which is maintained by vigorous community activity.

Accordingly, we tested the effect of the third type of integration (defined in terms of interaction) in relation to relative change. By dividing the communities into two groups, those whose leaders reported their age as "post-revolutionary" as compared with "pre-revolutionary," we sought to index the elusive morale factor which was uncovered in the analysis of absolute change. Seven communities were under twenty-five years of "age" while the others were reported older than this. This cutting point makes 1933 the dividing year, and historically this is more or less the period when the ejidos organized in this region.

Table 3. Change in Institutional Rank by Reported Age of Community

Reported Age	Change in Institutional Rank		
	Decline (2 or more)	No Change	Rise (2 or more)
Under 25 years	1	1	5
25 years or over	5	10	2

munities stated that they had high integration and that their friendships were based mainly on ejido membership and having their fields close together. The hacienda communities felt their solidarity was weak and based their friendship on kinship and being born in the same village.

12. F. Young and R. Young, "Two Determinants of Community Reaction to Industrialization in Mexico," op. cit.

Table 3 shows the result obtained. Five of the seven "new" ejido communities had advanced two or more places. The one such community that lost ground despite its post-revolutionary formation is, ironically, a group that migrated to a site adjacent to a hacienda community, merging with it in all but name and a separate ejido organization. In contrast, the older communities show more variation. Most change very little, but the four of the five that lost two or more positions are hacienda communities. The two deviant cases that gained rank despite their older age are both large communities with vigorous local governments. One is an ejido community whose age of twenty-seven years is just over the cutting point.

Discussion

In terms of the initial framework of this investigation, these results held two surprises. The first was that social change at the group level had both an absolute and a relative aspect. Despite the paucity of appropriate group-level indicators for it, the idea of absolute change is commonplace, but to our knowledge, relative change has never been discussed in the sociological literature. This is true despite the widespread occurrence of community rivalries over the location of new roads, etc., which affect their relative position. In this particular research, it is clear that the decision to study the region and to measure the institutionalization of communities led us to consider this aspect of change. As soon as one studies all the villages of a given area, it is apparent that they have definite positions in the larger regional structure.

However, the relation of both of these aspects of social change to the accepted core-meaning of that term might be questioned. If social change generally means change in the patterns of behavior of the members of a group, how can the acquisition of new roads or a different place in the regional social structure be equated with it? The discrepancy, we believe, is only apparent, and results from an improper comparison of what are in reality indices of change with the abstract concept itself. After all, changes in the "shell" of the institutions are generally correlated with changes in the patterns of behavior which are the real stuff of institutions. At least we assume so here. The relation is even closer in the case of relative change in institutional level. It is difficult to imagine that such a shift does not entail concomitant shifts in behavior patterns.

The other surprise occasioned by these results was the relationship of the three determinants of change to each other. We have mentioned that the wider framework of this research involves a comparison of four concepts of integration. These were: institutionalization, folk-urban, interaction or cohesion, and lack of social pathology. We expected these to affect the change variables, but not in concert. Social pathology we have not discussed in this paper because its functioning is of quite a different nature than the other concepts. The interaction variable was in line with expectations because it alone predicted relative change. But it was a surprise to find that all three factors (institutional level, urban orientation, and cohesion) combined to affect absolute change. We must conclude that the organization of communities is not exhausted by any one concept of integration, at least as they are operationalized here. Moreover, there are three separate factors which act independently of each other, and not one single concept, "integration," indexed in three ways.

These results may be drawn together by a return to the basic assumption of the theory that directs this study: that communities are reactive social systems with causal efficacy. To use an old but still pertinent phrase, they are "social facts." Although this assumption has always been part of cultural theory, its full implications have been eclipsed in recent years by the emphasis on the individual's role in the acculturation process. Since change appears to begin and end in the individual's mind, theories of acculturation have tended to de-emphasize the systemic changes that societies undergo. The changes that occur in "culture," when they have been discussed as group level phenomena, are described as if culture were a passive thing. The traditional question has been: "What is the impact of urbanization or industrialization on the rural community?" The image is one of a large hammer assailing the isolated, stable village or tribe. Recently, studies of cases have appeared[13] in which we learn that industrialization may not lead to disintegration if such-and-such conditions prevail. However, the basic question has not been changed.

The chief difficulty with the traditional form of the question is that it misdirects research efforts. Industrialization is not a heuristic concept. As it is usually employed, it is a collection of attributes: a mobile labor supply, mechanization, rationalization of factory tasks, dependence on the international economy, etc. Moreover, the locus of these attributes is usually vague. It may be a city miles away or it may be a factory in the village. Sometimes even the changes in work habits of individuals or the presence of particular items like tractors are considered the evidence of impact. Under these conditions theory is debilitated and the result is usually piecemeal, essentially atheoretical hypotheses. An example of a hypothesis that reflects this approach is that "contact leads to change." But as in other situations involving "contact"--for example, between ethnic groups--unless we know the larger context of the contact, we do not know its meaning or its likely effect. It is not surprising then that we found no relationship between contact and change.

The assumption that communities are reactive systems leads to hypotheses that by-pass these conceptual dead-ends. All of the variables which have been shown above to relate to change are aspects of the community system and reflect a responsive organization. This position was recently reaffirmed by the members of the Social Science Research Council Summer Seminar on Acculturation,[14] setting the stage, we believe, for a renewed attack on this problem of the group-level determinants of cultural change.

However, this way of phrasing the research question does not deny the obvious effects of something outside the community system. Rather, it suggests that that "something" is another system--the national organization--which, like the community, also has effects. Industrialization, in this view, is but one aspect of this larger system, and the relation between the community and the

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13. See M. Mead, New Lives for Old, New York, 1956; and M. Nash, Machine Age Maya, American Anthropologist Memoir No. 87, 1958.

14. Social Science Research Council Summer Seminar on Acculturation, 1953, "Acculturation: An Exploratory Formulation," American Anthropologist, 56, 1953, pp. 973-1002.

nation becomes more properly a special case of integroup relations. It is the case (usually) of the national political unit and its metropolitan and industrial subsystems expanding to include the labor supply and institutional resources of outlying villages. Their inclusion depends upon the characteristics of village organization, and the result of such incorporation is standardization of the community so that it functions harmoniously as a part of a larger whole. The changes that occur in the village may now be considered part of this process in which some things are added and some things subtracted from the village. It is "re-outfitted," so to speak, for its place in the larger system.

In this reinterpretation of the process of village modernization, the three determinants of change reported above become indicators of the community's readiness for incorporation. The two variables of social change would reflect the kinds of rearrangements that occur in order that the village and the region may function in an urban-industrial system. Given this conception, the basic research question is: "What are the characteristics of a community which enable it to achieve incorporation in the urban system?"

In general the literature in anthropology has not posed the question in this form, but the few attempts that have been made to answer it merit review. One school of thought asserts that no answer is possible. This seems to be a just characterization of the view of the cultural configurationalists. If, as they assert,[15] each culture is unique, then no generalization is possible. Presumably we must study each particular instance of change, attempting to interpret it in terms of the unique patterns of culture that may be involved, and learning nothing in one study that will guide us in another. At the very least, this view seems to limit research to ex post facto investigation: what would be the use of studying a unique case before change has actually occurred? Indeed, if one accepts prediction as a scientific goal, why study such cases at all?

The second point of view is perhaps the standard anthropological position, which states that "well-integrated" cultures resist change while poorly integrated cultures accept it readily. Thus, according to Ralph Linton: "After a few unfortunate experiences, a society of this sort (i.e., closely integrated) is likely to set its face solidly against all change and, if it is in a politically subject position, to develop elaborate techniques to keep the existing culture intact and resist all attempts to change it"..."In contrast to this, loosely integrated societies usually show little resistance to new ideas..."[16] Now one of the first questions that must be settled in considering this view is what is meant by "integration." The usual picture is a functional one in which the culture is internally consistent and harmonious and adjusted to its environment.[17] However,

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15. According to M. Mead, in Cultural Patterns and Technical Change, Paris, 1953, p. 304, "As each culture is unique, and as each particular situation within which a change is occurring or is to be made is unique, it is not possible to lay down prescriptions for what is to be done in any particular case."

16. R. Linton, "Cultural and Personality Factors Affecting Economic Growth," B. F. Hostelitz, ed., in The Progress of Underdeveloped Areas, Chicago, 1952, p. 87.

17. Ibid., p. 86.

insofar as this view is held, research is doomed to strangulation by definition. Apparently, any society that changes is not integrated, since it could not have been perfectly integrated if it accepted some new element. At any rate, our evidence appears to contradict this view. The communities among the twenty-four that did not change are by almost any conceivable definition unintegrated. They are poor, ignorant of the world, apathetic, dissatisfied and full of conflict. In contrast, the high change communities appear to qualify as integrated on any but a static conception of that term. However, the present results admittedly do not come to grips with some other meanings that have been assigned to social integration, so different results may yet emerge. 18

A third answer has begun to crystalize in recent years as a result of the experience of specialists doing applied work such as community development or the introduction of practices. In the first activity the investigators learn from hard experience which type of community responds to attempts to stimulate it. In the second, the innovator must learn to make prior judgments as to what communities will accept new practices and in what way. Although the answers that have emerged from this experience are not yet abstracted or rigorously tested, they are at least based on comparative experience. These judgments emphasize the relative wealth, organizational vigor, wide communications and previous experience with change of the accepting communities. 19 Insofar as this is a correct summary of their view, the results here reported tend to support it.

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18. It is interesting that Linton gives as examples of closely integrated communities the Rio Grande Pueblos and Indian groups of Guatemala. R. Beals, in "Unanticipated Effects of Planned Culture Change," read at the April, 1959 meeting of the Southwestern Anthropological Association, has argued that many of the Indian communities that survived Spanish pressures developed what might be called an "encysted" community organization. They were rigidly or hyper-organized as a defense against environmental pressures. If this is true, we may have to deal with three degrees of integration: low, regular, and extreme. A hypothesis that partly resolves the differences between Linton's hypothesis and our data might be: Change varies curvilinearly with the degree of integration: Loosely and extremely integrated communities will tend to resist change. This proposition assumes common factors in Linton's picture of integration and the interaction or cohesion concept used here. If such basic identity is not in fact the case, the two hypotheses would of course revert to their separate and contradictory status.

19. See, for instance, H. Belshaw, "Some Social Aspects of Economic Development in Underdeveloped Countries," in Lyle W. Shannon, ed., Underdeveloped Areas, New York, 1957, pp. 190 to 194 and see also Ahmed Hussein and Carl C. Taylor, Informe de la Misión Encargada de Estudiar la Organización y el Desarrollo de las Communidades Rurales en Mexico y la Región del Caribe, Publicaciones de las Naciones Unides, ST/SOA/Ser. 0/7, 1953.

GROWTH MODELS AND THE ESCAPE FROM THE LOW-LEVEL EQUILIBRIUM TRAP: THE CASE OF JAPAN

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I. Introduction

Our aggregate growth models[1] are troublesome tools for analysis of economic growth. If economic growth is defined as an increase in per capita income these models do not explain growth. So long as the parameters stay fixed they preclude growth. Given the parameters of the model, an equilibrium rate of growth of national income and an equilibrium level of per capita income can be deduced. Though these models explain growth of total national income, growth of per capita income can be explained only as movements toward a new and higher equilibrium resulting from changes in the parameters of the model: production functions, institutions, etc. But these changes are "outside" the model.[2] The model does not explain them. It explains only their effect.

But these models do suggest that the results of changes outside the model may differ in kind depending on whether the economy is rich or poor. Because of this, while small changes in the parameters of the model will explain only small changes in per capita income in rich economies, they may explain very large changes in per capita income in poor economies. They may explain an "escape from the low-level equilibrium trap,"[3] a "take off into self-sustained growth."[4] We still must go outside of the model to explain growth of per capita income, but we can explain a lot of growth with just a little outside the model juggling.

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1. Specifically, J. Tobin, "A Dynamic Aggregate Model," Journal of Political Economy, April 1955; and R. M. Solow, "A Contribution to the Theory of Economic Growth," Quarterly Journal of Economics, February 1956. But these models are basically sophisticated extensions of the Harrod-Domar theme.

2. In a more ambitious model institutional change and innovation might be endogenous. See, for example, W. W. Rostow, The Process of Economic Growth, Norton, New York, 1952.

3. R. R. Nelson, "The Low-Level Equilibrium Trap in Underdeveloped Economies," American Economic Review, December, 1956.

4. W. W. Rostow, "The Take Off Into Self-Sustained Growth," Economic Journal, March, 1956.

If the model does describe the processes by which a poor economy starts growing, and if the outside the model juggling is treated explicitly, then, contrary to the presently fashionable belief, it seems likely that the early stages of growth should be marked by little increase in the capital-labor ratio, and perhaps even by a falling capital labor ratio. A significant increase in the average propensity to save and a rapid growth of the capital stock may be in large part the result, not the cause, of the early growth surge. This seems to have been the case in Japan.

In this paper I shall first briefly restate the equilibrium growth model and the special case of the low-level equilibrium trap. Innovation will be treated explicitly. Then I shall try to show that the growth of the Japanese economy from 1868 is the type of growth that the model would lead us to expect.

II. The Model

A. The Equilibrium Framework

In our model the labor supply is assumed to be a constant fraction of population and the rate of aggregate output (income), at any time, is assumed to be a linear homogeneous function of the capital stock and the labor supply at that time. The marginal products of capital and labor are both assumed to be subject to diminishing returns. From these assumptions we can deduce, first, that per capita income can increase only if the capital labor ratio increases and, second, that as the capital labor ratio increases the marginal and average product of capital must decrease. Thus, we can deduce that, given any particular production function, as per capita income grows the average and the marginal product of capital must fall. Or, to put it another way, as per capita income grows, so must the capital output ratio.

If we assume that the rate of growth of population is a constant and that the average propensity to save (and invest) also is constant,[5] then the model defines an equilibrium level of per capita income. For if per capita income is to grow, the rate of growth of the capital stock, $\frac{\dot{K}}{K}$, must exceed the rate of growth of population, $\frac{\dot{P}}{P}$. But the rate of growth of capital equals the average propensity to save, $\frac{S}{Y}$, times the capital-output ratio, $\frac{K}{Y}$. The former we have assumed is a constant, and the latter must fall as per capita income grows, if the production function is unchanged. Thus our assumptions imply that $\frac{\dot{K}}{K}$ must fall as per capita income grows. And if $\frac{\dot{P}}{P}$ is a constant, at some level of per capita increase $\frac{\dot{K}}{K}$ must fall below $\frac{\dot{P}}{P}$.[6]

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5. Actually the necessary assumptions are much less stringent.

6. For this, to be true for every possible non-zero $\frac{\dot{P}}{P}$, we must make a few more assumptions which will not be discussed here.

In Figure 1, $\left(\frac{Y}{P}\right)^*$ is a stable equilibrium level of per capita income. If income is at any other level it will move, through time, to $\left(\frac{Y}{P}\right)^*$.

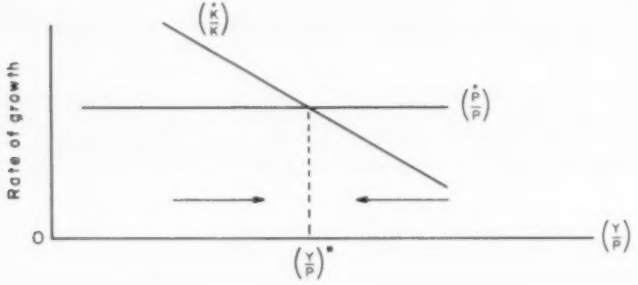

Fig. I

The low-level equilibrium trap results from a slight, and obvious, modification of the basic growth model above.[7] The rate of population growth, instead of being assumed a given constant, is assumed to be an increasing function of per capita income at low levels of per capita income approaching a constant as per capita income gets large. Similarly, the average propensity to save, instead of being assumed a constant, is assumed to be an increasing function of per capita income approaching a constant as per capita income gets large. It can be shown that these assumptions can yield the curves of Figure 2.

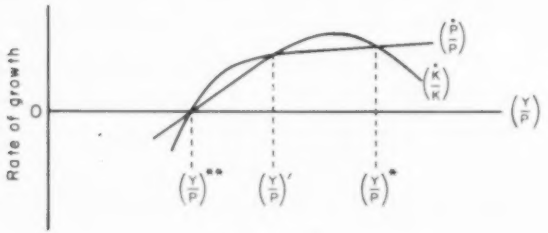

Fig. II

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7. See, for example, R. R. Nelson, op. cit.; H. Leibenstein, A Theory of Economic Demographic Development, Princeton University Press, 1954; N. Kaldor, "A Model of Economic Growth," The Economic Journal, Dec., 1957.

In Figure 2 there are two different stable equilibrium levels of per capita income, $\frac{(Y)^*}{(P)}$ and $\frac{(Y)^{**}}{(P)}$. $\frac{(Y)'}{(P)}$ is also an equilibrium, but it is unstable. "Developed" economies are assumed to be at $\frac{(Y)^{**}}{(P)}$; "under-developed" economies at $\frac{(Y)^*}{(P)}$. At $\frac{(Y)^*}{(P)}$ per capita income is low and tends to be stable. The savings rate is low, and sufficient to support only the growth of population. Small increases in per capita income will stimulate an increased saving rate and rate of growth of capital, but also a larger induced increase in the rate of population growth. The economy is caught in the low-level equilibrium trap. But if per capita income can somehow be forced above $\frac{(Y)'}{(P)}$ the trap will be sprung. The economy will then take off into sustained growth to $\frac{(Y)^{**}}{(P)}$

B. Shifting Parameters and Economic Growth

The formal model has assumed a given production function, savings function, and population growth function. Changing the parameters of the model will of course change the equilibrium levels. It is changing parameters, social and technical change, which is the mainspring of growth of per capita income.

For an economy caught in the low-level equilibrium trap a change in institutions increasing the average propensity to save for a given per capita income may sufficiently shift and pivot the $\frac{\dot{K}}{K}$ curve so that the low-level equilibrium will become unstable. This is sufficient to spring the trap, and much of the theoretical literature on the subject of economic growth has tended to focus on this possibility. The problem of under-developed economies is seen as that of forcing the savings rate from five, to say fifteen percent of national income. But changes in the savings function this drastic may not be necessary. For a positive rate of technical change, innovation, by increasing output from existing factors, can take a share of the burden of increasing per capita income from capital formation. As long as the rate of innovation is positive, per capita income can be growing even though $\frac{\dot{K}}{K}$ is less than $\frac{\dot{P}}{P}$ (Figure 3).[8] Per capita

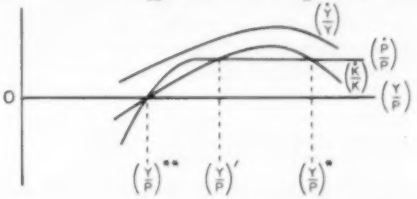

Fig. III

8. It can be shown that if $Y = A\,f(K, P)$ where A is an index of the level of technology and $f(K, P)$ is linear homogeneous, then the rate of growth of per capita income can be written

$$\frac{\frac{(\dot{Y})}{(P)}}{\frac{(Y)}{(P)}} = \frac{\dot{A}}{A} + S_K\left[\frac{\dot{K}}{K} - \frac{\dot{P}}{P}\right] = \frac{\dot{A}}{A} + S_K\left[\frac{\frac{(\dot{K})}{(P)}}{\frac{K}{P}}\right]$$

where $\frac{\dot{A}}{A}$ is the rate of technically neutral innovation and S_K is the share of capital in national income.

income can be rising even though the capital labor ratio is falling. If the rate of innovation continues positive long enough for per capita income to rise above $\left(\frac{Y}{P}\right)'$, then the trap is escaped, for the rate of capital formation will then be sufficient to support sustained growth to $\left(\frac{Y}{P}\right)^{**}$, even should innovation cease.

Note that it is not necessary for the savings function to shift substantially to enable escape from the trap. It may be more common for an increased saving rate to be in large part the result of an increased per capita income, not the cause of it. The distinction here is between a shift in the savings function, and a movement along it. A shift in the savings function causes a change in equilibrium per capita income. A movement along the savings function is a result of a change elsewhere in the system. In the period when the trap is being escaped, the rate of growth of capital may be less than the rate of growth of population, and the capital-labor ratio may be falling. A rising capital-labor ratio and a high average propensity to save may be signs that the trap has already been escaped, and that growth is now self-sustaining even if the rate of innovation were to fall to zero. This seems to have been the case in Japan.

The term "innovation" has been used in this paper as a catch-all to explain any increase in output that is generated from a given population and capital stock. This includes innovation of the Schumpeterian sort (improved production techniques) but it also includes increased labor efficiency, longer hours of work, improved allocation and fuller utilization of existing factors--what may be described as the taking up of economic slack. Although Schumpeterian innovation is probably the primary factor explaining the increase in output from given factor endowments that has been experienced in advanced economies, in backward economies improved and fuller allocation may be more important. Again this seems to have been the case in Japan.

III. Japan's Escape from the Low-Level Equilibrium Trap

In this section the growth of the Japanese economy between 1867 and 1890 will be sketched and interpreted as the escape from the low-level equilibrium trap--the take off into sustained growth. But before Japan's escape from the trap can be discussed the stage must be set by an outline of Japan's economic structure in the Tokugawa period.

A. The Japanese Economy in the Tokugawa Period

At the end of the sixteenth century an era of civil wars among powerful independent feudal lords, or Daimyo, came to an end as the Tokugawa family established unchallenged military supremacy. For the next two-and-one-half centuries the Tokugawa military dictatorship, or Shogunate ruled Japan. Although the Shogun was sovereign, he did not monopolize the loyalty of the population. Rather each Daimyo had his armed retainers, the Samurai, and his peasants who were feudally obligated to him. Therefore throughout the Tokugawa period, Shogun policy was oriented toward keeping the Daimyo militarily subservient.[9]

9. K. I. Choi, "Tokugawa Feudalism and the Emergence of the New Leaders of Industrial Japan," Explorations in Entrepreneurial History, Dec., 1956.

Supporting the structure were the peasants, about three-fourths to four-fifths of the population. The peasant's crops, his clothes, his house, and much of his time were prescribed by Daimyo regulation, and forty to sixty percent of his produce was stripped from him by a percentage tax on yield to support the feudal elite.[10]

The first century of Tokugawa rule was one of relative prosperity. As peace and harvesting replaced war and crop destruction the Japanese population rose from less than 20 million at the end of the 16th century to about 28 million in the first quarter of the 18th century and the expanding population moved onto previously uncultivated land. But by 1700 little land remained onto which population could expand without heavy investment in irrigation and fertilizer. Tokugawa rule and Tokugawa peace had stimulated expansion as long as available free land had enabled land capital to increase with population. But as unused land diminished in quantity, the income of the growing peasant population was forced to the subsistence level. According to Taeuber, "By the early 18th century the balance between people and rice had become so precarious that continued population growth for any period of time was impossible."[11] Around 1725 the Japanese population stopped growing.

The Japanese peasant tried desperately to keep down family size for even where the marginal physical productivity of labor was high, the high percentage tax on yield made each additional family member a heavy liability. Despite restrictive laws, infanticide and abortion thrived. Infanticide was so common that the practice was known as mabiki, the term used for thinning a row of vegetables. But though infanticide may have prevented famine from occurring as frequently as it might have, the practice was not the major factor holding down population. "The ultimate controls were famine and epidemics."[12] The level of technology was low, the propensity to direct increased per capita income to saving was small; Japan was caught in the low-level equilibrium trap. Japan's capital, income, and population remained nearly constant for 150 years.

In the later years of the Tokugawa period the curtain that had kept Japan isolated from the west was gradually lifted. The possibilities of increasing productivity by applying western technology were enormous, and many Japanese realized this. The economic elite, however, had little to gain from innovation. In the tradition-oriented society their status was secure. Further, Tokugawa policies, aimed at maintaining the status quo, provided serious obstacles to innovation and capital formation.

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10. G. B. Sansom, Japan, A Short Cultural History, D. Appleton Century, N. Y., 1943.

11. I. Taeuber and E. Beal, "The Dynamics of Population in Japan," in F. Notestein, ed., Demographic Studies of Selected Areas of Rapid Population Growth, Milbank Memorial Fund, N. Y., 1944.

12. Ibid., p. 6.

But during the later years of the Shogunate period the nucleus of a new economic elite was being formed. The growth of towns, stimulated in part by overcrowding of the land and in part by the Tokugawa policy of requiring Daimyo and Samurai to spend a part of each year as hostages at the seat of the Shogunate, gave rise to a growing class of merchant-manufacturers and rice brokers, the Chonin. The Shogun, in order to keep the lords militarily impotent, encouraged competitive extravagance, and increasingly the old elite grew indebted to the Chonin.

Tokugawa restrictive policies provided serious obstacles to the one avenue of advance open to this increasingly powerful, but low status, group. Meanwhile, the status of the increasingly indebted Samurai (their military prowess now socially useless) was slipping and their dissatisfaction with the status quo was growing. And the dangers of western imperialism were becoming obvious. Many Japanese were coming to believe that their country could avoid the fate of China only by the establishment of a strong military, and that the prerequisite for this was the development of a modern economy.

Economic strength and political control fell increasingly into the hands of different groups. The achievement of national as well as individual goals was being blocked by the existing regime. Pressures for drastic change were becoming great.

B. The Restoration of 1867 and Japan's Escape From The Low-Level Equilibrium Trap

In 1867 the dam burst. The Shogun was ousted and his rule replaced by that of a government dominated by Chonin and Samurai interests. During the next decade feudalism was abolished and the direction of national policy shifted from preservation of the Shogunate to strengthening of the Japanese military to contain the western threat.[13] The statesmen of the new government fully realized that a strong productive economy was the foundation of a strong military state, and set to the task with alacrity.

The evidence is quite clear that income, and per capita income, began to grow rapidly. Ohkawa's figures show an annual rate of growth of national income at current prices of over 5 percent during the 1880's and 1890's.[14] No reliable national income figures exist for the 1860-1880 period, but the vast majority of the available crop and industry series show a rapid advance during the period.[15] And the long constant Japanese population also started to grow at

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13. For an excellent discussion of the motivations of the new elite see G. Ranis, "The Community Centered Entrepreneur in Japan," Explorations in Entrepreneurial History, Dec., 1955.

14. K. Ohkawa, The Growth Rate of the Japanese Economy, Kinokuniya Bookstore Co., Ltd., Tokyo, 1957, p. 7.

15. See, for example, S. Tsuru, "Economic Fluctuations in Japan, 1868-1893," Review of Economics and Statistics, Nov., 1941; G. C. Allen, A Short Economic History of Modern Japan, 1867-1937, Macmillan, 1947; and W. Lockwood, The Economic Development of Japan, Princeton Press, 1954.

an increasing rate, averaging about one percent a year during the seventies and eighties. Taeuber believes that the principal cause was a decline in the death rate that accompanied rising per capita income.[16] Thus the population spurt in Japan was of the sort predicted by the trap model.

But the first two decades after the revolution do not appear to have been marked by a rapid growth of the capital stock. The savings rate in Japan during this period was certainly below 5 percent of income. Yamada estimates a savings rate of 5 percent for the 1893-97 period.[17] Staley's[18] estimate that 12 percent of income was invested in 1901-1910 was derived by dividing estimated capital formation by Mori's[19] estimate of national income. However, Yamada and Tsuru believe that Mori underestimated income by about 100 percent. Assuming a capital output ratio of two or three, the capital stock could not have been growing at a rate much faster than 2 percent a year during the 1870-1890 period, and was probably growing at a much lower rate than this during the 1870's.

Ranis, in his study of factor proportions in several Japanese industries, has found that capital-labor ratios were falling during the seventies and eighties.[20] Lockwood estimates that in 1890 the horsepower of steam-driven industrial machinery in Japan amounted to only 4,100, the equivalent generated by fifteen 1960 Cadillacs.[21] Tsuru's data for new factories established shows a sharp increase only after 1880.[22]

Thus the rapid growth of per capita income prior to 1890 or 1900 cannot be adequately explained by a rapid rate of capital formation. The rate of growth of capital may have exceeded the rate of growth of population, but not by very much.

After 1900 the story is different. Japan, by then, was saving close to ten percent of national income. Ohkawa estimates that the savings rate was between 14 percent and 18 percent for the 1906-1910 period.[23] Ranis finds that

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16. Taeuber and Beal, op. cit., p. 6.

17. Y. Yamada, Oriental Economist, 1951, p. 507.

18. E. Staley, World Economic Development, I. L. O., Montreal, 1944.

19. K. Mori, "The Estimate of the National Wealth and Income of Japan Proper," Bulletin de l'Institut International de Statisque, Tome 25, Vol. II.

20. G. Ranis, "Factor Proportions and Japanese Economic Development" American Economic Review, Sept., 1957.

21. W. Lockwood, op. cit., p. 3.

22. S. Tsuru, "Economic Fluctuations in Japan, 1868-1893," Review of Economics and Statistics, Nov., 1941.

23. Op. cit., p. 168.

the capital labor ratio was rising after the turn of the century. From 1900 on then, the growth of per capita income in Japan is explained adequately by a rate of growth of capital which significantly exceeded the rate of growth of population. Japan was out of the low-level equilibrium trap. Her relatively high saving rate is an indication of this. The high post-1900 savings rate is explained by, rather than explains, Japan's early growth surge. By 1900 the institutions had been formed and per capita income had already reached a high enough level to support rapid capital formation.

But the primary factor raising per capita income in the 1867-1890 period was increased economic efficiency--innovation in the broadest sense--rather than massive increases in capital. Existing factors of production were more fully employed and economically allocated and new production techniques were introduced. The limited supplies of new capital were skillfully placed. It was the taking up of slack which enabled per capita income to rise sufficiently by the 1890's to permit the high savings rate which henceforth was the prime mover of Japan's growth. This is not to argue that increased investment did not contribute to Japan's growth during this period. Rather the argument is that the major element of the growth model which was shifting was the production function, rather than the savings function.[24]

The basis of the pre-Meiji economy was self-sufficient production units, although toward the close of the Tokugawa era there was a certain amount of regional specialization, and several large cities. Daimyo policy aimed at assuring as great a degree of self-sufficiency as possible and Shogun law prevented resources from moving to their most productive uses by prescribing guilds in industry and fixing the peasant to the soil. High marginal taxes dampened incentives to invest and discouraged the adoption of new methods. The policies of the new government enabled increased specialization, gave increased incentive to produce, and stimulated the adoption of more productive methods. In 1869 all classes were made equal before the law. Feudalism was abolished. By 1872 guilds were abolished and all classes made legally free to choose their occupations. Concurrently with the relaxation of restrictions to factor mobility and to innovation, the new elite, strongly motivated themselves, infused the Japanese masses with a zeal for economic progress. Patriotism and economic growth were closely linked in the reformulating value structure of the new Japan.

The slack in the economy proved to be particularly great in agriculture. In 1872 and 1873 the institution of private land ownership was established, and the land tax revised from a yield tax to a tax on land valuation and from a tax payable in produce to one that had to be paid in money. Taxes could no longer be avoided by not producing. Marginal private gain was increased as the tax was shifted to a fixed base. The necessity to pay taxes in money stimulated quantity production for the market--stimulated the growth of a market-oriented economic system of efficient specialized units.

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24. I am not arguing that the saving function did not shift at all, only that there is more evidence for a large shift in the production function than for a large shift in the savings function.

During the 1870-1900 period, output per farm laborer doubled.[25] This increase in farm labor was effected through more extensive use of irrigation, more liberal use of fertilizer, use of better rice seed, and increased double cropping. Irrigation may have increased production per acre by as much as 50 percent.[26]

Since the rise in labor productivity on the farm was sufficient to maintain the per capita food production for a growing population, the increased labor force could be directed toward laying the foundation of an industrial Japan. In addition, though the shifting of wealth from Samurai to Chonin had forced members of the Samurai to enter business during the late Tokugawa era, there existed a large reservoir of potentially productive labor among this group and the policy of the new government was to direct the ex-Samurai to productive ends. In 1874 the government capitalized into bonds the yearly pensions that had been granted to ex-Samurai when the government abolished feudalism, and these bonds provided a security for loans that enabled many ex-Samurai to start new businesses. The government granted tax relief and often subsidies to those establishing new businesses. Members of the old Samurai class staffed the government bureaucracy, the army, and the police force. The Samurai became egg sellers, tailors, establishers of small businesses, and the directors of the merchant-owned enterprises. The once functionless Samurai became the business leaders of the new Japan. In a wide range of fields the Japanese began to borrow from western technology. Western gunboats provided ample evidence of how much Japan could, and would have to, learn. The collapsing of the old institutions, the coming to power of a new elite, and a long tradition of disciplined obedience to authority--all fostered the ability to absorb. And Japan's original backwardness made enormous the gains from adopting modern techniques.[27]

Government efforts to improve Japanese production techniques were extensive. Foreign advisors in the applied sciences were hired by the government to train the Japanese. Students were sent abroad to learn western technology. Government laboratories and experimental stations were established and results were rapid. Much of the increased rice yield in the eighties and nineties is attributed to new varieties of rice seed developed in Government laboratories.

Although, quantitatively, government capital purchases were not great, the government played a very important role in planting the seeds of new industries. In 1877 the government purchased two spinning machines from England and offered them gratis to any entrepreneur who would start a modern spinning mill. In the seventies the government commenced construction of Japan's telegraph network. In 1870 the first railroad was built oy the government. In many other industries the government built model plants, which were in time sold to private industry, and granted tax relief and subsidy aid to private investors.

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25. B. Johnston, "Agricultural Productivity and Economic Development in Japan," Journal of Political Economy, Dec., 1951.

26. W. Lockwood, op. cit., p. 500.

27. J. K. Fairbanks, "The Influence of Modern Western Science and Technology on Japan and China," Explorations in Entrepreneurial History, April, 1955.

In summary, the growth of output during the seventies, eighties, and nineties was principally the result of the more efficient and full allocation of resources, and the flood of minor innovations just described. As Lockwood puts it, "Through the nineteenth century, indeed, the economic gains from railway construction in Japan were overshadowed in their immediate economic importance by the benefits from the local building of narrow dirt roads, the introduction of the ricksha, and the growing use of carts.... Increasing mobility, achieved mainly by simple, even traditional techniques, was of great importance in reducing local price differentials, in moving people to cities in search of new occupations, and in facilitating the growth and diversification of production."[28] And as in transportation, so it was in agriculture and in most manufacturing industries. The slack in the Japanese economy was enormous, and the taking up of this slack enabled Japan to escape from the low-level equilibrium trap, enabled per capita income to grow sufficiently to support a high savings rate and sustained growth.

I must remain agnostic as to the relevance of the preceding theoretical and historical analysis to the problems of today's under-developed economies. The theoretical conclusion that massive capital formation need not play the prime role in the take off into sustained growth, that a high savings rate may be the result, not the cause, of the early stages of development, is empirically documented by the case of Japan. But it is not obvious that the same opportunities for greatly increasing output per worker with only negligible increases in capital per worker exist today in India or Peru. But neither is it obvious that these opportunities do not exist. And increasing the rate of innovation, broadly defined as in this paper, may be an easier task than greatly increasing the rate of investment, given the existing low standard of living.

But it must be confessed that we currently know far less about how to improve economic efficiency than about how to increase the capital stock. The theoretical section of this paper explores the effects of a positive rate of innovation. Why the rate of innovation is what it is, and why and how it changes, are not considered at all nor am I aware of any really successful treatment of the subject. Yet certainly our understanding of the process of long-run economic change will be sorely limited until we gain a better understanding of the processes of economic and social innovation.

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28. W. Lockwood, "The Scale of Economic Growth in Japan," Economic Growth, Brazil, India, Japan, Duke University Press, 1955.

CIRCULAR CAUSATION IN DEVELOPMENT AND LOCAL GOVERNMENT: THE PHILIPPINES AS A TEST CASE*

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I. Introduction

Gunnar Myrdal's thesis of circular causation[1] offers an interesting and challenging starting point for the understanding of developmental problems. Myrdal rejects equilibrium as a basic model, except under certain limited conditions, and instead postulates reciprocal reinforcement of developmental and counter-developmental trends. He labels the counter-developmental tendencies a "backwash effect," and countervailing developmental tendencies, usually launched as a result of conscious programs and investments, a "spread effect."

One application of this thesis is in relation to local government. Here in microcosm one may examine the interaction between governmental and administrative structures on the one hand, and social-economic behavior on the other. A widely held view of the nature of this interaction has been clearly stated by the agricultural economist, A. B. Lewis.[2]

Lewis asserts that in the advanced countries locally supported and directed governments provide the basic services, such as schools and roads, which contribute indispensable requisites to development. In contrast, in all underdeveloped countries, he asserts, government is highly centralized, and local administration is so hopelessly enmeshed in red tape, corruption and maladministration that it cannot provide these services. Moreover, the local constituency, deprived of a chance to see immediate benefits for their taxes, tends to withhold payment and otherwise block effective local government services. Hence Dr. Lewis prescribes increased local self-government as an indispensable condition for economic progress.

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* The following paper is abridged and adapted from the author's "Economic Development and Local Administration: A Study in Circular Causation," Philippine Journal of Public Administration, III, 1, 1959, pp. 86-146.

1. Economic Theory and Under-Developed Regions, London, Duckworth, 1957.

2. "Local Self-Government: A key to National Economic Advancement and Political Stability," Philippine Journal of Public Administration, II, 1, 1958, pp. 54-57.

The situation in the Philippines appears to bear out this thesis. Local governments are so hampered by central administrative controls that their effectiveness is gravely compromised. There is growing political pressure from local politicians, and even from leaders in the national government, to adopt legislation granting local authorities a larger measure of autonomy. The implications for economic development are often stressed as a crucial reason for such reforms.

An examination of this position in the light of Myrdal's thesis of circular causation, however, suggests an alternative interpretation. Overcentralization and weak local administration may be viewed as a consequence, as well as a cause, of regional underdevelopment. Strengthened local government might emerge as a result of economic development in a region, not only as one of its conditions. Once the demand for, and capacity to support, effective local institutions has emerged, local government may be expected to become stronger, and to contribute substantially to development.

Economic stagnation in a region similarly contributes to ineffective local administration, and promotes "backwash effects." Legislative grants of more local autonomy, under such conditions, would reinforce and intensify the backwash effect, rather than produce a "spread effect." Indeed, according to the circular causation hypothesis, the way to reverse undesirable economic trends in a depressed region would be to inject strong countervailing influences from outside the region, and these could be expected to come chiefly from the central government itself. Hence strong centralization appears to be not only a symptom of underdevelopment, but also perhaps an essential precondition for starting local developmental processes.

These general hypotheses may be tested by data drawn from the Philippine setting. First, however, it is necessary to spell out a general model, defining terms and stating some of the more special hypotheses which underlie the circular causation thesis as applied to this example.[3] After that a typology of developmental patterns will be suggested.

II. A General Model

A. Definitions

In the discussion which follows some special usages are employed, making it necessary to define the key concepts.

1. Clientele is defined in terms of the interests which affect local government. Those interests which arise within a local government's domain or territory are the internal clientele; those outside, the external clientele.

2. The degree of compatibility of interests expresses the extent to which satisfaction of one set of interests facilitates or obstructs the satisfaction

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3. These definitions and hypotheses, explained at some length in the original article, are here re-stated for convenient reference.

of other sets of interests. Facilitation refers to a high degree of compatibility; incompatibility, a low degree. Compatibility refers to the mid-point on this scale, in which satisfaction of one set of interests neither aids nor injures another set.

3. Distribution on a scale refers to the extent to which in a particular setting the values on a scale are found to be clustered close together about a point, or widely scattered. Location refers to the point on a scale which defines the average or central tendency of a setting.

4. Wants refer to anything subjectively desired by someone. Demands refers to those wants which are sufficiently strong for the subject to be willing to pay whatever cost is required for their satisfaction. Wishes refer to wants which are not demands.

Expectations refer to one's views or estimates of the possibility of satisfying wants. Interests refers to a pattern of demands and accompanying expectations. Interests may be termed valid if the expectations are correct, assumed if incorrect.

By needs we refer to an external observer's estimate of what a person ought to want. The needs are felt when the subject consciously wants them, not felt when he is not conscious of wanting them. The validity of a need does not depend on its being experienced as felt or not felt, but the practicability of a governmental program demanded by external clienteles depends on the extent to which the program meets felt needs of the internal clientele.

5. Development refers to the degree to which change has taken place along the continuum measuring shift from subsistence to interdependent or market economy. If that shift is accompanied by an increase in productivity we may call the process positive development. If the shift is marked by a general decline in productivity, it may be termed negative development. The degree of development thus measures the extent of change toward a market system; the character of development, the extent to which productivity has risen or fallen. There is no reason to assume that development in one country will be uniformly positive or negative. Rather, it may be assumed that both types of development regularly occur. What is to be studied, therefore, is the weight to be assigned to each trend, and the pattern or configuration of their mixture in the diverse regions of a country, and on the urban-rural continuum. Characteristically an "underdeveloped country" is not marked so much by lack of development as by a low ratio of positive to negative development--hence strong backwash effects.

6. The ratio between Production and Consumption in the behavior of any individual may be termed his P/C ratio. When the characteristic economic behavior of an individual (person, family, firm, etc.) is marked by an excess of production over consumption (P/C ratio greater than unity) we may speak of the unit as a Supporter; when the P/C ratio is less than one, as a Dependent.

Linking these concepts with Myrdal's discussion of circular causation, the "backwash effect" could also be characterized as a situation of declining productivity, negative development, and Dependent domination; the spread effect as one of increasing productivity, positive development, Supporter domination.

7. Political processes are universalistic to the extent that they consider all persons affected by a given decision; particularistic to the extent they consider only a few of the persons affected.

8. Solidarity is achieved when recruitment is based on skills, capacities and interests of the recruit; ascribed when it is based on the identity of the recruit, i.e., factors over which he has no control.

9. Degree of consensus measures the extent of shared values, including the value judgment that social and political values are important. When the importance of values is generally recognized but the content of these values is not shared, we may speak of negative consensus; when the content is shared, positive consensus. When the degree of consensus is low, we may speak of indifference.

10. A population may be called mobilized if it regularly participates in a large-scale communications network; assimilated if it shares the basic symbols (language, religion, myths, etc.) of the elite.

B. Hypotheses

The following hypotheses extracted from the original essay in the Philippine Journal of Public Administration where they are explained and illustrated at some length, are here listed in rather schematic fashion.

1. The strength of local government varies directly with the degree of compatibility of the interests of the internal and external clienteles, the degree to which there is consensus within these clienteles on goals and policies, and the intensity of local clientele interests. Reciprocally, of course, the strength of positive economic development varies with the strength of local self-government.

2. The need for local government services varies with the degree to which the economy of a region is developed. However, the character of local government varies with the character of the developmental process, i.e., positive development strengthens local autonomy; negative development, central control.

3. The degree of compatibility of internal and external clientele interests varies with the character of development, i.e. positive development promotes mutual facilitation of clientele interests; negative development, incompatibility (see Figure 1). Incompatibility of interests leads to a power struggle resulting in central government domination or political fragmentation, i.e. partition, independence. Facilitation leads to reciprocal cooperation and permissiveness.

Lack of development is marked by compatibility, (i.e. neither high nor low degree of compatibility) between internal and external clientele interests, hence very limited local government services, little control and little struggle.

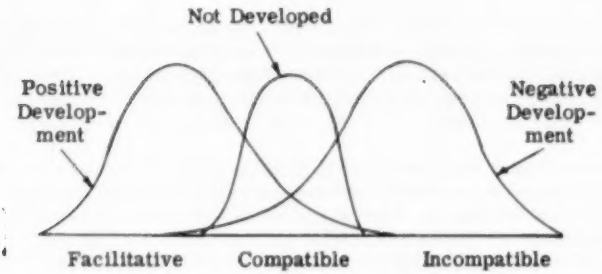

Figure 1

4. The intensity of local clientele interests, and the degree of consensus tends to vary with the character of development, i. e. they increase with positive, decrease with negative development.

5. It follows from the foregoing that legislation to strengthen local autonomy will not automatically strengthen economic development; rather, it will reinforce whatever trends and elites are locally dominant, i. e. negative or positive development, Dependent or Supporter elites.

6. The degree of differentiation of economic and administrative behavior from political, social, ideological, etc. varies with the degree and character of development, i. e. the more developed, and the more positive the developmental pattern, the greater the differentiation. In areas of negative development, therefore, economic and administrative behavior is less differentiated from other aspects of social behavior than in areas of positive development.

7. The character of development varies with the character of the political process; i. e. the more universalistic the political process, the more positive the developmental; the more particularistic, the more negative. Hence the strength of local self-government varies directly--as cause and consequence--with the degree of universalism in political behavior.

8. The character of development varies with the character of its solidarity structures; i. e., the more achieved the bases for solidarity, the more positive the developmental trends; the more ascribed, the more negative. Hence the strength of local self-government varies directly--as cause and consequence--with the achievement/ascription ratio in local solidarity structures.

9. The degree and character of development varies with the content of the value system. The more secular, equalitarian, contract-oriented, rational, analytic, and individualistic, the values of a population, the more development

has and will take place. Where development has not taken place, values tend to be sacral, organismic, hierarchic, status-oriented, ritual, and intuitive.

Areas of negative development tend to be characterized by overlapping and therefore competing value systems which may be characterized as charismatic, communalistic and anarchic, ambivalent, impulsive, eclectic and mimetic. The strength of local self-government, therefore, varies directly--as cause and consequence--with the character of the value system.

10. The degree and character of development varies with the degree and character of consensus on relevant values. The more developed the economy, the greater the consensus; but the more positive the development, the more positive the consensus; the more negative the development, the more negative consensus. Where development has not taken place, a low degree of consensus, or indifference, is widespread. The need for local government, therefore, varies with degree of consensus, but the character of local government varies with the character of consensus, i. e. autonomous if consensus is positive; centralized if negative.

11. The extent and character of development varies with the character of the communications system; i. e. the degree and balance of mobilization and assimilation. The more mobilized and assimilated the population to a national communications net, the more developed, and the more positive the developmental pattern. Areas of little or no development are marked by low levels of assimilation and mobilization. Areas of negative development tend to be marked by imbalance between the degrees of mobilization and assimilation; usually, though not always, experiencing more rapid mobilization than assimilation. The strength of local self-government, therefore, varies directly with the degree and balance of mobilization and assimilation in the communications net.

12. The foregoing hypotheses may be summarized in the following: The strength of local self-government varies directly, and in circular causation, with:

a. the degree of positive economic development;
b. the degree of universalism in politics;
c. the degree of achievement-orientation in solidarity;
d. the character of the value system; and the degree and character of consensus; and
e. the degree and balance of mobilization and assimilation in the communications net.

13. The strength of local government also varies with its demographic-geographic and formal institutional basis. To indicate the meaning of this hypothesis, it is necessary to present a simple typology of environmental and institutional factors.

III. A Developmental Typology

The foregoing propositions suggest a uniformity and consistency of developmental patterns which, of course, is far from the truth. They can only be used as very rough guides in the analysis of specific situations. We may

work out our analysis at several levels; the typological and the specific or unique setting.

Typologically, for example, we may classify together as a single type a number of societies which seem to be similar in their developmental patterns. Although all types might exhibit the broad characteristics indicated by the foregoing hypotheses, each type would exhibit its own distinctive variations within the general hypotheses or theory.

A. Geographic-Demographic Typology

To illustrate, we might distinguish as a base line for development traditional agricultural societies classified in terms of a continuum ranging from areas of dense to those of sparse and scattered settlement (see Figure 2). Zones of scattered settlement were typically inhabited by tribal peoples, often shifting and marginal cultivators. They usually had no central government, and local government was fused with an extended family system.

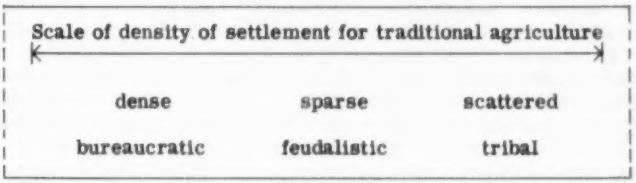

Figure 2

In areas of relatively sparse settlement, central governments tended to be weak and local government, however autocratic, tended to be relatively autonomous. This was the prevailing condition in feudalistic societies.

By contrast, in areas of denser settlement, central bureaucratic governments tended to be relatively strong, and were successful in reducing or eliminating the autonomy of any local governments which might challenge central control. By local governments we refer to levels above that of the village, such as the district, municipality or province. The primary local level, embracing the village and family, could be strengthened under bureaucratic regimes, both because it could not challenge central power, and because it would tend to resist resurgent autonomous local government at the next higher level. [4]

To avoid misunderstanding the reader should recall that we are referring here to societies prior to development, i.e., enjoying a subsistence rather than

4. For an elaboration of this thesis see Riggs, "Agraria and Industria" in Toward the Comparative Study of Public Administration, Indiana University, 1957, pp. 23-110; see especially pp. 27-40.

a market economic base. Hence the processes of negative development had not yet undermined the capacity for local autonomy. Modern efforts to revive archaic forms of village self-government are often handicapped by a nostalgic myth which fails to note the real differences between the former subsistent rural community and the contemporary village in an "under-developed country." The social and economic structure of the modern village is far more battered than its historical counterpart, and the tasks it is asked to perform are vastly more complex and costly.

If we consider now the historical patterns of development, it is immediately apparent that the industrially most developed countries have evolved from agricultural areas of relatively sparse population, i.e. from feudalist societies. They did not stem from densely populated bureaucratic societies, nor from extremely sparse tribal societies. In the feudal societies, local authorities were strongly entrenched, and traditions of local self-rule were never fully overthrown. Although the regional patterns in these countries are quite mixed, and contained zones of negative development, zones of positive development were frequent. They included the free cities and republican communities of independent farmers. Consequently the circular interaction of local autonomy and positive development may be viewed as having a long history, going back to the beginnings of the developmental process.

When we look at the main "under-developed" countries today, we are struck by the fact that in many, if not most, of them, the pre-modern society was either one of dense, or at least semi-dense, agricultural settlement or else very sparse tribal nomads or shifting cultivators. The weakness of local government was correlated with its predominantly fragmented village character, under bureaucratic administration, or else has a tribal structure.

As developmental processes were launched in response to--indeed often as a condition of--the industrial revolution in Europe, backwash effects set in, regardless of whether they retained their independence or fell under colonial domination. The notable exceptions were Japan, which, with a feudalistic background, was able to industrialize, and some countries, like Siam and Tibet, which were able to impede development, thereby preventing some of the worst consequences of negative development. Tribal societies, on the other hand, have been able largely to retain their fragmented local organization.

That local governments remain very weak in the dense agricultural countries has several explanations. First, institutional weakness was inherited from the past, when imperial bureaucratic central governments were determined to suppress all manifestations of self-rule. Second, where, as in many of these countries today, Dependent elites have come to power in the central government displacing the former aristocratic-bureaucratic rulers, they retain strong controls over local government in order to safeguard the processes whereby the rural masses have been increasingly exploited. And third, even where positive development has gained a foothold, new Supporter elites require strong central controls to launch the spread effect against deeply established backwash effects.

If this analysis is correct, it follows that the persistence of centralization in Philippine government, for example, has deep organic causes, and cannot be accounted for as simply a perpetuation of Spanish or American laws and

traditions. Rather, Spanish centralization, involving the transformation of neo-feudalistic society into at least a semi-imperial-bureaucratic mold, was strongly oriented toward the support of bureaucratic and Dependent elites. American and Philippine nationalist rule have both been marked by the efforts of central government Supporter elements to reverse the backwash effects, against the resistance of continuingly-strong Dependent elites. It is, accordingly, a mistake to attribute local negative development or even the weakness of local administration to governmental centralization. Indeed, today central government programs provide the main hope for reversing negative trends to the point where local autonomy will become both the necessary and feasible means to accelerated positive development.

B. The Legal Component

One of the most persistent and readily analyzed forms of human effort to shape his environment may be found in the laws which prescribe patterns of behavior for governments and citizens. Much of the discussion of the problem of local government has been in terms of attempts to discover appropriate legal formulae whereby local administration can be improved. Insofar as local self-government would strengthen local economic development, one of the simplest, cheapest and most attractive ways to spur development would be to legislate more local autonomy. But before accepting this optimistic expectation, we should examine more closely the conditions under which legislation can effectively affect behavior, and the limitations on the use of this approach to social change.

We do not doubt that laws and institutions can often exercise a powerful impact on society. Indeed, much of the research and literature about government in the Western countries is preoccupied with legal and institutional factors. It is not surprising that both legislators and students of government who take their models from Western countries should share this emphasis.

A deeper inquiry, however, will reveal a variable relationship between legal institutions and the society in which they operate. Laws appear to be a reflection of social conditions as much as their cause. The principle of circular causation applies also to the relation between law and society. What are the connections between a society and its laws? Can a typology be employed here to complement the geographic-demographic base?

In approaching this question, let us contrast the situations of subsistence or underdeveloped societies, positively developed and negatively developed societies.

1. Regions of Subsistence Economy

Looking first at the subsistence society, we find nothing adopted through legislative processes resembling those of a modern state. However, we do find norms regarded as obligatory prescriptions for social behavior. These are of two main types, one emanating from rulers (both religious and secular) and the other emerging from among the common people. We might associate them with the "Great" and "Little" traditions of the "traditional agricultural societies."

Laws which issue from the rulers may be called "commands" or "commandments." Their content relates largely to the maintenance of peace and order and the payment of due respect (and tributes) to the rulers (both divine and human). The enforcement of such commands depends on the self-interest of the rulers themselves whose perpetuation in power is based on their capacity to secure conformity. The religious element, whether derived from sincere convictions or not, usually serves the indirect function of reinforcing the authority of the rulers by capitalizing on the people's fears and beliefs.

The laws which emerge among the people vary from place to place, and rest in the memory of local persons--generally older men and women--who recall how previous cases of a similar type were decided. Such law is often called "customary law," but it might be better to refer to it as the "traditions" of a place. Enforcement of these traditions depends largely on the voluntary consent of the face-to-face community concerned, and the employment of mediation and compromise which minimize the degree to which hard decisions according to tradition have to be made.

2. Regions of Positive Development

Turning to societies marked by a high level of positive development, we see that law takes a completely different form, originating largely through the conscious deliberation of legislators and other government leaders who seek to use the law as a means of prescribing behavior to deal with innumerable complex problems arising out of the developmental process itself. Legislation is typically characterized by a high degree of fluidity and elaboration, involving substantial conformity of social behavior with the prescribed norms. Much administrative machinery of government and an elaborate judiciary are devoted to its implementation and enforcement.

The legal system, then, is distinguished by the high degree of conformity between behavior and law, its relatively impersonal implementation, and the process of continuous legislative revision and enactment. Underlying these characteristics, and basic to them, is a relatively high degree of harmony or compatibility between the beliefs and needs of the population on the one hand (what has been called the "living law") and the law promulgated and interpreted by legislatures, courts and administrators. The problems of enforcement arise from the nonconformity of a small number of deviants, and from questions of interpretation and elaboration, including the amendments needed to bring old laws into alignment with continually changing social realities.

Under these conditions legislation--a self-conscious contractual process--provides a powerful instrument for social regulation in a highly complex, interdependent society. Innumerable problems arising from the intricate interdependence of members of an industrial society often find solutions through legislation. Thus the growth and reshaping of legislation continually responds to, and in turn helps determine the dynamic processes of positive development.

3. Regions of Negative Development

Although the need for a means to coordinate behavior is as great in societies of negative as of positive development, the basis for congruence is lacking. Elaborate legal superstructures are as precarious as skyscrapers

built on a mudflat. Three major reasons for the wide discrepancy between law and practice in these regions may be noted.

The first is related to the huge gap--both economic and spiritual--between the Dependent elite and the subject population in these societies. Laws enacted to suit the requirements of the elite are often ill-suited to the wishes of the subject population. Paradoxically, laws which strengthen positive development can be exploited by Dependent elites to intensify negative development. The system of courts and the enforcement of contracts, for example, helps to consolidate the special privileges of landlords and moneylenders.

Laws intended to secure registration of land-holdings and persons, to regulate the use of forests, to prevent the spread of contagious diseases and pests, to control soil erosion, etc. may all be regarded by the rural masses as oppressive, laying the basis for taxation and regimentation, and undermining traditional means of livelihood. General resistance to law enforcement is predictable, and available administrative resources are totally inadequate to secure conformity. Of course, this generalization may have exceptions--specific laws whose benefits are welcomed by the rural population. The number and weight of these exceptions will tend to vary directly with the power of Supporter elements in the national government, and inversely with the degree to which the process of negative development is advanced.

A second fundamental reason for the discrepancy between law and practice is to be found in the survival of customary law (traditions)--even though in fragmented and decayed forms, long after the processes of negative development have started. To many, especially of the older generations, these traditions symbolize an honored but lost way of life. They may be contrasted with the new-fangled and--to them--oppressive laws of the city-dwellers. Hence the resistance to law rests on a sense of righteousness as well as of self-interest.

As indicated above, the decay of old traditions and the weakness of new laws leaves a normative gap which manifests itself in violence--"lawlessness," and "outlawry." Thus the burdens imposed on governmental organization--both military and police--for the maintenance of peace and order are increased, thereby reducing the resources available for positive efforts to reverse backwash effects. Even the campaign against lawlessness often encourages further lawlessness since it is frequently accompanied by arbitrary arrests, commandeering of supplies, etc., which aggravates popular hostility and resentment against the government.

A third major factor contributing to the gap between law and practice is the uncritical borrowing of foreign legal forms. Such borrowing has several latent functions. First, a government improves its prestige position in international circles when it can boast of having legislation of the most advanced type--in social security, labor protection, minimum wages, public health, compulsory education, pure food and drugs regulation, the suppression of involuntary servitude, child labor, etc.

Secondly, foreign advisers, backed up by the attraction of grants and counterpart funds, often urge legislation based on foreign models. Legal and indeed all higher education in an "underdeveloped" country tends to be based on

Western models, so that many government leaders, including legislators, have learned to think in terms more relevant to industrialized countries than to their own.

Finally, the weakness of associational and popular political life means that few realistic proposals for legislation emerge from within the society itself. The peasant masses remain largely inarticulate, and even the universities, which should be strongholds for research into basic social realities, are so overwhelmed by the need to maximize teaching output in the face of inadequate budgets that they cannot afford to provide the basic incentives for original and productive research. Hence legislators flounder helplessly in their search for viable laws, and naturally fall back on ideas and formulae which, because they work well abroad, are assumed to be suitable for domestic needs as well.

The distinctions may be summarized by using the term endogenetic to refer to a process of legislation which reflects popular and general, not just elite demands; indigenous rather than alien concepts; well-considered rather than improvised ideas. The terms exogenetic refers to the opposite tendency.

Referring to our geographic-demographic typology, we may say the prospects for emergence of endogenetic legislation is strongest in the sparsely populated, feudalistic societies, weakest in the densely populated imperial bureaucratic and scattered tribal societies where a ruling elite--whether native or foreign--usually tries to impose strongly exogenetic legislation on the subject population.

In feudalistic conditions, therefore, endogenetic legislation and relative congruence of law and practice prevailed. Where exogenetic legislation prevailed, the split between law and practice widened.

4. The Gap: Formal vs. Effective Law

When the gap between a law and social reality is too great--i. e. when the formal and effective are divorced--two major administrative consequences follow.

The first might be called ritualization. Since the assumed goals behind a law do not appear as clearly defined and feasible objectives, backed up by a well-organized clientele, the administrator may rely on meticulous fulfillment of the letter of the law regardless of consequences. This is often a safe course of action which insulates him from criticism and may well assure his security and promotion within the bureaucracy--especially if the seniority rule prevails, as it usually does. One sees here a phenomenon which has been called the "triumph of technique over purpose" or, in a telling phrase of the sociologists, the "displacement of goals." Latent functions of the law tend to take precedence over its manifest functions.

A second type of reaction appears to be the exact opposite of the first. When the social pressures are overwhelmingly against the law, or the resources to implement it are totally inadequate, it may be effectively disregarded, even though rendered lip-service. A few inspectors employed to enforce a sanitary regulation, for example, in the face of widespread ignorance of, and even opposition to, the law, have to decide which of its aspects to enforce, or which

persons should be compelled to comply. In practice, they may abandon the task as hopeless, but decide to accept a few "gifts" in exchange for non-enforcement.

Such behavior reinforces the vicious circle of negative development. Non-enforcement and accompanying bribery corrupts the administrative service--especially when payments to inspectors become institutionalized as "over-right" payments to higher officials--and produces public cynicism and hostility to government. The de facto power of the administrator to make effective policy is increased at the expense of the de jure authority of the legislator, who finds himself increasingly engaged in a formalistic word game. Small wonder that he turns to the more rewarding game of influence-peddling on appointments, contracts, permits, etc.

Part of the difficulty faced by the legislator--and the baffled citizen--is the impossibility of predicting whether a particular legal provision will be minutely enforced or virtually set aside. One might suppose that bureaucrats will choose which course to follow according to the dictates of their self-interest. Indeed, an official might do both at the same time, first demanding full compliance with the letter of the law, then arranging--for a consideration--to have it set aside.

Whatever the explanation, it is apparent that the more unenforced and unenforceable the legislation of an "underdeveloped country," the more difficult it becomes to determine which old laws need revision, and the greater the temptation to indulge in reckless new enactments, perhaps in the vague hope that another law might just happen to deal efficaciously with a problem. Legislative incontinence produces a legal mess which increasingly tempts would-be tyrants to seize power by armed force and make a clean sweep of the past.

5. Local Government: Authority vs. Control

So far as the question of local administration is concerned, it is apparent that attempts to deal with the problem by legislation run serious risks, especially if they involve uncritical transplantation of rules which, however well they may work in regions of positive development, are little suited to the needs of a region dominated by negative development.

Moreover, the discrepancy between law and practice means that, although governmental authority is highly centralized in an underdeveloped country, its effective control is actually quite limited. Even though local clienteles cannot realize many of their wishes without the consent and support of the center, the reverse proposition is also true: the center is impotent to compel localities to implement many of the laws and regulations it adopts. Hence proposals for new legislation on local government require the most careful scrutiny not only in regard to their general relevance and theoretical soundness, but also to determine their enforceability.

From the foregoing argument we may conclude that legislative enactments can be used most effectively to strengthen both local government and positive economic development in predominantly endogenetic legal systems, having a feudalistic demo-geographic base. Conversely the more exogenetic and bureaucratic the system, the more limited the effectiveness of legislation for local government and development.

Summarizing, we may say that the settings most conducive to positive development were those of sparse agricultural settlement with feudalistic and endogenetic institutions; those facing the greatest obstacles to positive development were areas of scattered and dense settlement with tribal and bureaucratic governments, and exogenetic institutions. By our hypothesis of circular causation, positive development and local government thrive in the first type of settings, negative development and central intervention prevail in the latter.

IV. The Philippine Example

To test the validity and usefulness of the hypotheses and typologies presented above we may utilize factual data drawn from any single country. Having placed the setting chosen in terms of the general model and typologies, one could make predictions concerning behavior to be expected. Empirical data would be sought to test these predictions. When data contradictory to the models is discovered, the models themselves would be subjected to necessary revision, and then applied again in new situations.

In doing this it must be emphasized that any particular country would be expected to exhibit a complex mixture of elements which could be identified with all the models and typologies. The uniqueness of any particular country lies not in its expression of the features of a single model, but rather in the way in which it combines elements drawn from several models. This view fits the hypothesis of circular causation whereby we expect to find differences in the extent of "backwash" and "spread" effects in various regions of the country, and the ways in which they overlap each other.

The Philippines is offered as a useful example for the testing of these hypotheses. In the first place the author has selected this country for the purely personal reason that he happens to be working there. However, there are also good theoretical reasons for the choice. On the developmental continuum, the Philippines has certainly reached, if not passed, the mid-point between purely agricultural and highly industrialized societies. Although not so industrialized as Japan and Western countries, it is more industrialized than other Southeast Asian nations. The pronounced negative developmental trends in many rural regions is counteracted by powerful positive developmental forces, especially in the Manila metropolitan area.

In terms of the baseline for development, the Philippines also falls into an intermediate category. Starting as an archipelago of scattered agricultural settlement, it exhibited a pattern of incipient feudalistic political forms, highly fragmented and dispersed in character, without a central governmental structure. Within this framework vigorous entrepreneurial and productive activities had emerged in the pre-Spanish period, with the growth of important market and foreign trade centers.

Upon this society Spanish imperial-bureaucratic rule was imposed, but the agricultural base remained predominantly sparse, except for the immediate hinterland of Manila and, perhaps, Cebu, where population density increased strikingly. Hence a mixed feudalistic-bureaucratic system emerged, more bureaucratic near its core, and more feudalistic and even tribal as one moved toward more inaccessible zones. This system proved ambivalent toward

entrepreneurial growth, alternating between encouragement and suppression of foreign entrepreneurs, and permitting bureaucrats to profit from personal participation--often formally illicit--in trade. Under this regime, very limited positive development began, but strong negative developmental trends spread throughout the countryside, undermining earlier pre-Spanish economic growth.

The extent to which highly centralized governmental authority actually succeeded in imposing control over rural districts tended to vary with communications distance from the capital. More inaccessible areas remained uncontrolled, often even unexplored.

The American occupation, and subsequent independence, brought major changes in the economy, especially through the introduction of a powerful spread effect radiating out from the capital. However, in the process some negative or backwash effects appear to have been actually strengthened in hinterland regions.

Governmental and legal institutions, having been largely introduced by foreign rulers, and more recently by foreign-educated intelligentsia in the roles of legislators, judges and administrators, have a pronounced exogenetic character. Nevertheless, the spread of Christianity in the Philippines, and more recently the extensive establishment of public primary education, have brought the value system of the population closer to that of the elite. Independence has also made possible more widespread public participation and influence in the legislative process. Hence the institutional structure is perhaps by now more endogenetic than that of most Asian countries.

From these considerations we may tentatively classify the Philippines as intermediate in type, both as between the bureaucratic and feudalistic agricultural societies, and as between endogenetic and exogenetic institutional patterns. On this basis we might predict substantial ambivalence between pressures for local autonomy and dominant centralizing tendencies, and a pronounced overlap between hinterland backwash effects, and spread effects radiating from Manila. [5] We now turn, therefore, to the empirical data to test these predictions.

A. Uneven Development

The "spread" effect from Manila may be discovered in the primary impulses for development which continue to flow from the capital. This impulse reaches out over the country through an elaborate network of agencies such as the Presidential Assistant for Community Development (PACD), the Bureau of Agricultural Extension, Public Health, Education, Highways, Commerce,

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5. Since Dependent as well as Supporter tendencies are to be found in Manila as well as in the rest of the country, it is also apparent that the Manila influence cannot be counted as exclusively a spread effect. Indeed, it may be classed as exercising also a considerable backwash effect. Hence the analysis of what is happening in any particular place will have to take into account the balance or the "mix" of these contradictory tendencies in order to form a realistic picture of what is happening.

Reconstruction Bank, Rice and Corn Program, National Power Commission, etc. to name but a few. Although the individuals who guide and operate these programs may not be natives of Manila, they have been largely attracted to the capital for their education and employment, and then move out from the capital which remains the focal center of their activities.

If these activities are to succeed in reversing the backwash trends in the localities, they must stimulate local groups to want development, and to put forth the effort required to attain such development. The attempt by the PACD to induce barrio people to carry out "self-help" projects, based on their "felt needs," is this type of enterprise. The term "felt needs" is well chosen because it refers to those matters in which the outside clientele diagnoses a need, and finds that the local clientele experiences the need as at least a wish, and potentially a demand. In other words, the process may be defined as an external clientele with an interest in positive development seeking ways in which, with minimal cost, it may encourage growth minded sectors of the economy to launch activities calculated to raise productivity. As and when such growth begins to occur, external support may be gradually withdrawn, until the locality can mobilize enough resources--in labor power, goods and money--to continue the process on its own.

B. Local Collections and Allotments

The extent of the spread effect from the capital may be indicated to some extent by revenue and national allotment figure. An extraordinarily large part of total national revenues comes from the Manila metropolitan area. Of this total, only a small part is returned to the city of Manila in the form of allotments. During fiscal year 1956-57, for example, total national government revenues from all domestic sources amounted to ₱945.5 million. Total collections by local governments turned over to the Bureau of Internal Revenue amounted to ₱543.3 million, but ₱61.3 million were turned back to local governments as allotments, leaving a net income to the government of ₱482.0 million from local government collections, about half of total receipts. The second major source of revenue was customs duties, collected by the Bureau of Customs, amounting to ₱201.3 million. Special funds brought in ₱72.8 million, of which ₱72.4 million came from the highway fund alone. Another ₱139.0 million came from earnings and other credits to government enterprises, leaving some ₱50 million from various other sources.

An analysis of these sources of revenue shows that an extremely large proportion was derived from a few urban centers, of which Manila stands out above all others. Thus of the ₱543.3 million collected from local governments, Manila collected ₱437.6 million. If we consider the metropolitan areas as a whole, the total would come to ₱462.0 million, or more than 85% of all collections by local governments. (This includes ₱6.1 million from Quezon City, ₱2.6 million from Pasay City, and ₱15.7 million from Rizal Province). Cebu, the second largest city, collected ₱17.7 million, and Negros Occidental, the next largest contributor, paid in ₱6.8 million, thus adding another 5% to the total from the most developed areas. All the rest of the country scarcely contributed 10%.

Although a breakdown by point of origin is not available, there can be little doubt that a similarly large portion of the other main sources of national revenue originated in the Manila zone. Certainly most of the customs duties were collected in the port of Manila. As a major transportation center, much of the highway fund must have been collected in the Manila area, and similarly a large part of the income of government services and earnings originated in the metropolis.

If we look at government allotments to local entities[6] in relation to their collections, we get an even better idea of the relationships between zones of positive and negative development. The most developed regions contribute most in relation to what they collect. Thus Manila, in 1956-57, received ₱5.4 million, or scarcely more than 1% of its collections and Cebu received ₱0.8 million, or about 4.5%. Most cities (22 out of 28 in 1956-57, or almost 80%) collected more than they were allotted, only 6 receiving more than they collected. In the latter category a city like Marawi, for example collected only ₱.02 million, but received ₱.09, or 450% of its collections.

Provincial governments, as might be expected, collected much less in proportion to allotments than the cities. Of the 53 provinces, only 18 (about 34%) collected more than their allotments, whereas 35 (over 66%) collected less. Only two provinces, Rizal (in the metropolitan zone) and Negros Occidental (sugar zone) collected more than twice their allotments. Of the cities, however, 18 (about 65%) collected more than twice what they received, of which 10 collected more than 4 times what they received. The cities which collected less than they received as allotments are actually small towns which cannot be considered urban, and received their city charters only by virtue of special political considerations. Since allotments are calculated roughly on a per capita basis, it is clear from this data that the urban population, especially in the metropolitan area, contributes much more proportionately to the national budget than the rural areas.

The extent to which local governments are subsidized from Manila is not fully apparent from these figures since local income from national allotments constitutes only a small part of total national financial costs in each locality. In addition to the public works appropriations, expenditures of most national agencies in the localities are contained in the agency budget. There can be no doubt that the balance is very strongly in favor of the localities, which have developed an attitude of continuing expectation and dependence toward the central government.

Part of the reason for this striking one-sidedness is simply the greater extent to which urban taxes due are collected. Thus in 17 of 27 cities, or 63% (as of Jan. 1957), delinquencies on real property tax payments were less than the assessed valuation, whereas in only 17 of 53 provinces, or 32%, were delinquencies less than the assessed valuation. Delinquencies exceeded twice the assessed value in 15 provinces (28%) as compared with 3 cities (11%).[7] This

6. Allotments to each locality are determined on a fixed per capita basis for the whole country.

7. Special Tax Revision Commission, Property Tax Administration in the Philippines-1956, Manila, 1957, p. 107.

evidence supports the hypothesis that positive development not only increases productivity but makes the population willing and able to pay a larger percentage of the taxes due. Even so, the over-all rate of tax delinquency is disturbingly high, reflecting an advanced condition of negative development in the country.

The main reason for the difference between urban and rural contributions to the national budget, however, remains the basic fact that the most productive part of the economy is industrial; agricultural productivity on the average is very low, and the rural regions are net recipients of largess from the urban centers.

C. Three Developmental Zones

These propositions may be tested by a study of the actual agricultural productivity of the different provinces in relation to the urban centers, especially Manila. Some indices which might be used for this purpose have been worked out by Dr. Amos H. Hawley in a paper prepared for the Institute of Public Administration in 1954.[8] Dr. Hawley made use of the 1939 census data on the grounds that they were superior in quality and more complete than the data of the 1948 census, and he thought the overall conditions in 1954 were not substantially different from 1939. The basic pattern probably continues to be similar, although the forthcoming census returns may show highly significant changes in detail.

The Hawley data include figures for population density by total area and by agricultural workers per square kilometer of cultivated land. He also prepared figures to show the degree of population pressure (or worker productivity) as a percentage obtained by dividing the difference between actual and expected number of agricultural workers by the actual number. The expected number is calculated by dividing the gross value of agricultural product of each province by the average national gross peso value of product per agricultural worker. As a check against the reliability of these indices, he prepared an index of the "level of living" in each province, based on the kilometers of first class roads per 1,000 population, the percent of literacy, the percent of families with artesian water supply, and the percent of all workers in non-agricultural employment.

By using these figures we can distinguish three focal agricultural zones or types of provinces in the Philippines. Of course, actual variations occur on a continuous scale, and many individual differences in pattern exist, especially at the margins, so that any typology is necessarily arbitrary. But it may help clarify to some extent the relationships involved.

The types may be conceived roughly as falling within three concentric circles, taking Manila as the center.

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8. "Differential Population Pressure in the Philippines," in Papers in Demography and Public Administration (revised) IPA, UP, 1954, pp. 54-67.

1. In the Central Zone we find the provinces surrounding Manila. Here the spread effects from the metropolis are greatest, both in terms of government services, and the direct impact on the rural economy created by ready access to non-agricultural employment, markets, etc. In this zone we find the "level of living" index relatively high, averaging 1.85 in comparison with the national index of 1.00. Agricultural productivity for the whole zone is above the national average by 29.6%. Although these provinces are among the most crowded in the country in terms of total population per square kilometer (having an average density of 110.3 compared with the national average of 54) the number of agricultural workers per square kilometer of cultivated land averages 76 compared with the national figure of 87.

Table 1. Central Zone

13 provinces having the highest "level of living" in order of the index number

Province	Level of living index	Pop. per sq. km.	Agricultural workers per sq. km. cultivated land	% excess workers
National Average	1.00	54	87	000
1. Rizal	3.48	194	102	-11.5
2. Bataan	2.38	65	76	-44.6
3. Bulacan	2.11	127	72	-46.6
4. Pampanga	2.10	177	72	-67.4
5. Camarines Norte[a]	1.77	46	28	-37.9
6. Cavite	1.72	187	65	- 6.4
7. Nueva Vizcaya	1.48	12	118	-20.0
8. Laguna	1.47	155	60	-43.7
9. Pangasinan	1.46	142	104	-21.4
10. Nueva Ecija	1.44	77	46	-61.2
11. Tarlac	1.30	88	72	-52.0
12. Batangas	1.25	134	80	+20.6
13. Zambales	1.19	30	100	+ 7.8
Average	1.85	110.3	76	-29.6

a. Camarines Norte is the only province in this group outside the zone contiguous with Manila. It is significant that here the number of agricultural workers per square kilometer of cultivated land (28) is the lowest in the country, and well below the next lowest province, which is Quezon with 41 workers. This, plus the presence of profitable gold mines accounts for the high level of living. The impact of mining is suggested by the fact that only in Rizal is the percent of all workers in non-agricultural pursuits any higher.

2. The Intermediate Zone includes most of the Visayas and some provinces in northern and southern Luzon surrounding the Central Zone. Here

the backwash effects are more deeply felt as reflected in the lowered productivity of agricultural workers, being 98.4% below the national average. The level of living is low, 0.73 compared with the national index of 1.00. Crowding on the farm lands is shown by an average of 115 workers per square kilometer compared with the national average of 87. The degree of crowding is not correlated with the general population density of the province which varies within wide limits from 219 in Cebu to 6 in Palawan.

Table 2. Intermediate Zone

10 provinces having the highest percentage of excess agricultural workers relative to number expected to be able to produce the farm output of the province.

Province	Level of living index	Pop. per sq. km.	Agricultural workers per sq. km. cultivated land	% excess workers
National Average	1.00	54	87	000
1. Cebu	1.00	219	190	191.7
2. Palawan	.42	6	125	164.0
3. Bohol	.82	121	112	106.8
4. Negros Oriental	.62	75	122	89.8
5. Leyte	.51	116	104	87.6
6. Marinduque	.82	90	61	77.4
7. Antique	.74	75	96	71.6
8. Ilocos Sur	1.12	101	170	67.1
9. Samar	.52	40	86	65.8
10. Albay	.71	108	80	62.0
Average	.73	95	115	98.4

3. The third zone includes what might be called the Frontier Provinces. Here land is plentiful as shown by the size of the population per square kilometer: 15 compared with the national average of 54, for the 10 most sparsely populated provinces. In most, though not all, of these provinces, opportunities for new agricultural settlement abound. Hence with appropriate development, they could become the most productive in the country per capita. Nevertheless, the "level of living" index for the 10 provinces is 0.69 compared with the national index of 1.00, showing a relatively low rate of governmental aid. Negative development trends, despite plentiful opportunities for positive development, are revealed by the fact that the average number of agricultural workers in these provinces, per square kilometer of cultivated land, is 115.2 compared with the national average of 87.

Table 3. Frontier Zone

10 most sparsely populated provinces

Province	Level of living index	Pop. per sq. km.	Agricultural workers per sq. km. cultivated land	% excess workers
National Average	1.00	54	87	000
1. Palawan[a]	.42	6	125	164.0
2. Bukidnon	1.08	7	72	12.6
3. Agusan	.90	9	70	17.6
4. Nueva Vizcaya[b].....	1.48	12	118	-20.0
5. Cotabato.....	.30	13	115	60.0
6. Davao	.35	15	59	-29.7
7. Mountain Province..	.46	21	304	14.3
8. Isabela	.89	21	86	- 4.1
9. Zamboanga	.82	22	79	34.8
10. Abra	.74	23	144	11.9
Average	.69	15	115.2	26.1

a. Palawan overlaps the Intermediate Zone.
b. Nueva Vizcaya overlaps the Central Zone.

The productivity of agricultural labor, however, varies strikingly within wide limits for this zone. At one extreme, the most sparsely populated province, Palawan, nevertheless has the most inefficient land use, 164% below the national average. Cotabato, with a magnificent vast river valley which is said to equal central Luzon in potential, had a level of living of .30, the lowest in the country, and agricultural productivity was 60% below the national average.

Mountain Province has a low overall population, as might be expected because of its rugged terrain, but nevertheless land has been well utilized by the mountain people as shown by the fact that, although it crowds 304 agricultural workers (highest in the country) on each square kilometer of its terraced rice fields and other farm lands, its productivity per worker is only 14.3% below the national average. This shows, incidentally, the productivity which can be achieved by an economy relatively near its original subsistence basis. (Incidentally, the two provinces having major concentrations of the Muslim minority population have even higher levels of agricultural productivity--47.6% above the average for Sulu and 12.1% above the average for Lanao--despite the fact that they are relatively crowded on the land and have a low "level of living" index, reflecting little governmental aid. These two provinces are not included among the 10 most sparsely populated.)

Another province in the sparsely populated Frontier Zone is Nueva Vizcaya which is also included in the highly developed Central Zone. Here agricultural productivity is 20% above the national average, with 118 workers per

square kilometer of farm land, and a level of living index of 1.48, reflecting chiefly government aid in building roads and artesian wells.

The names of the provinces with the relevant statistics are given in the accompanying tables.

D. Productivity and Taxation

In concluding this analysis of the developmental status of agricultural zones, it is interesting to compare the tax collections in each province with its productivity. For example, there were 10 provinces in 1957-58 which collected more taxes than they received as national allotments. Of these 10.7 are included in the Central Zone (Bulacan, Camarines Norte, Laguna, Pampanga, Rizal, Tarlac, and Zambales). The other 3 are Agusan, Mountain Province, and Negros Occidental. Collections in the first two may be attributed to mining, and in the third to sugar.

At the other extreme, there are 17 provinces which collected less than one-third of the amount they received as allotments. Only one of these, Abra, is included in the 10 Frontier Zone provinces. However, five of them--Antique, Bohol, Ilocos Sur, Leyte and Samar--are included among the 10 Intermediate Zone provinces. Surprisingly enough two of these low-paying provinces are located in the Central Zone, namely Cavite and Pangasinan. Of the remaining nine low-payers, five are clustered together in the heart of the "Intermediate Zone" area: Capiz, Iloilo, Masbate, Romblon and Sorsagon. Three are adjacent to each other on the northern coconut coast of Mindanao: Lanao, Misamis Occidental and Misamis Oriental. The ninth is Batanes, the tiny island province far to the north of Luzon.

The complexity and incongruities in the specific details of the Philippine economic scene tend to obscure the over-all picture which we have tried to highlight through a certain amount of arbitrary selection of what seem to be decisive variables. A more minute examination will surely reveal even more complicated overlapping of factors. Thus, although the net effect of Manila is to promote a spread effect on behalf of its Supporter elements, the city also contains powerful Dependent elements. Owners of large haciendas living in Manila contribute to the metropolitan tax collections, but obtained this wealth by extracting it from impoverished tenants. Thus part of Manila's tax collections represents backwash as well as spread effects in the economy.

Moreover, government agencies spending funds in the provinces may protect Dependent interests which strengthen backwash effects, as well as promote Supporter interests. The same individual may contribute to both kinds of effect: his city factory, for example, to some extent cancelling out the social losses resulting from his rural hacienda.

Similarly within the countryside itself, all agricultural work is not equally regressive in impact. Indeed, some well-run, privately owned farms and plantations are quite productive in contrast to innumerable tenant farms operated on a sub-standard basis. The general picture remains valid, however.

V. Governmental Implications in Underdeveloped Countries

In the light of this material taken from a study of the Philippine situation, I shall now summarize and either confirm, modify, or reject the hypotheses with which this paper began. An attempt will be made to take a general view of the hypotheses by looking at some of the evidence and arguments concerning the problems of administrative "overcentralization" in the Philippines and in the "underdeveloped" countries in general.

From the hypotheses and the evidence in the Philippines, we would predict a high degree of centralized administration and local government weakness as both a symptom and a contributory cause of backwash or negative development.

A. Evidences for Overcentralization

In the Philippines, one kind of evidence for the validity of this prediction may be obtained from national departments such as education, health, agriculture, etc. which universally insist that surrender of control over the appointment of local personnel will everywhere cause demoralization. Of course, this viewpoint no doubt contains a considerable bias. But the dismal record of locally appointed police contrasts strikingly with the relatively far higher standards of the national Police Constabulary. Moreover, the urban centers of greatest positive development--such as Manila, Cebu, Baguio--seem to have the best local police forces.

Perhaps a more convincing kind of evidence on the same point may be obtained from the observations recorded by foreign consultants and students of public administration in the underdeveloped countries." One problem universally noted is terrific congestion of business and decision-making at the center, especially at the higher levels, and paralysis, overstaffing, and inaction at the periphery, i. e. in local government and at lower levels. Administrative inability to delegate authority and the weakness of local government are virtually always diagnosed as major causal factors, and proposals[9] are made to promote delegation and stronger local government through direct impact projects.

Although economic stagnation is often attributed to this administrative pathology, few observers have suggested that the administrative difficulties may also be caused by economic stagnation. According to the view presented above, however, this is actually the case.

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9. For a summary of these phenomena including references to the Philippines, as described in the reports of the International Bank see F. W. Riggs, "Public Administration: A Neglected Factor in Economic Development," Annals of the American Academy of Political and Social Science, Vol. 305, May 1956, pp. 70-80.

Many top government leaders in the "underdeveloped countries" are well educated and experienced. They readily understand the disadvantages of highly centralized administration. If they universally find it impossible to decentralize, despite many efforts in this direction, the explanation might be sought in some basic forces which defy simple manipulation. The hypothesis relating negative development, by circular causation, to weak local administration, provides a clue to the reasons.

In most underdeveloped countries the central governments, through innumerable projects, are seeking to reverse negative development trends. But the chief leadership and responsibility for this work falls on the capital and its leading officials. Delegation of more authority to governmental units in depressed localities does not appear to offer a solution, although many efforts have been made in this direction.[10]

In countries where not only the hinterland but even the capital city is in the grip of Dependent elites, no deliberate decentralization is to be expected, but the resources of the country will remain so limited that central control may be expected to remain weak, and hence make only a limited impact on local government which remains very poor and restricted in scope.

The phenomenon of overcentralization is probably specific to countries of negative development. Traditional regimes based largely on subsistence agriculture always tolerated very substantial degrees of decentralized power. Even when authority was most centralized, as in bureaucratic empires, they could not achieve full centralization of effective power and in fact had to delegate considerable authority.

B. Incompatibility of Clientele Interests

The following discussion illustrates our first hypothesis that the strength of local self-government within a national union varies directly with the degree of compatibility of the interests and needs of the external and internal clienteles of local government.

To illustrate this proposition, we might look first at a traditional agricultural society. Here subsistent rural populations have both little to ask for and not much to fear from the central government. Similarly the center, although demanding that localities maintain peace and pay taxes, makes few demands for positive conformity of behavior. Hence local clienteles have few incentives to cling to the center and the center is generally content so long as there is no trouble in the localities. Thus the substantial real decentralization, even in the most centralized bureaucratic system, is based on mutual indifference as much as on technical obstacles to effective centralization of power.

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10. See Hugh Tinker, The Foundations of Local Self-Government in India, Pakistan and Burma, University of London, 1954, for documentation of efforts to devolve responsibilities to local authorities, resulting largely in failures.

In a positively developed region, although some incompatible and merely compatible interests are to be found, we would expect to find a large number of facilitative interests shared by the internal and external clienteles of each local government. Examples of these facilitative interests have already been given in the basic discussion above, but here by way of recapitulation we merely indicate their implications in schematic fashion. Facilitativeness of interests encourages a national elite to permit local self-rule since thereby the external interest will be attained more than it will be sacrificed, i.e. the external clientele is satisfied that if the internal clientele selects local government policies in terms of its self-interest, these policies will also serve the interests of the external clientele.

Conversely, local clienteles not only seek local autonomy but, equally important, they reduce drastically the scale of their demands on national government. In other words, they are content to permit their representatives in the capital to think largely--though not exclusively--in national rather than purely local terms because they believe that, in the long run, what serves the interests of the national clientele will also benefit the local clientele.

C. Tensions: The Fruit of Incompatibility

In a region of marked negative development, by contrast, although the same wide scatter between facilitative and incompatible interests may be observed, a disproportionately large percentage are incompatible. The content of these incompatible interests may usefully be summarized here.

In regard to the external clientele, we should distinguish the interests of Dependent from Supporter elites. The Dependent elite's characteristic demands for payment of rents and interest are incompatible with the economic interests of the rural subject population, and may even clash with local Dependent elites, although they may also be in alliance with this group. The Supporter elite's characteristic demands, however, are for the development of new crops, expansion of markets and investment opportunities, labor supply, and may even include willingness to pay higher prices for farm commodities. These demands undermine the preferential position of local Dependent elites who may sharply oppose them.

The demands of the internal clienteles are the reverse of these. Dependent elites seek official sanction and protection in the enforcement of collections from the subject population. The subject population, for its part, seeks relief from these exactions. The first type of demand is incompatible with the interests of external Supporter elites, the latter with the requirements of external Dependents. Open efforts to obtain satisfaction of these demands tend to aggravate tensions within and among the internal clienteles themselves. However, both local Dependents and subject populations can usually agree on the need for local improvements that the central government will pay for. Hence one way for the local clientele to create the illusion of harmony is to unite in seeking national aid. These wants, however, are clearly incompatible also with the competing claims of other localities also seeking a cut from the national budget.

Incompatibility of interests leads to tension. Under certain conditions it might lead to political fragmentation, with a region splitting off to form a new

state, or at least an "autonomous" zone. More typically, however, it leads to intensification of the bonds of formal centralization. Thus revolution and over-centralization are not contradictory developments so much as alternative responses to the same pathology. The path chosen depends partly on the relative strength and vitality of the center as contrasted with that of any given region. The strength of revolutionary sentiment in turn is affected by such factors as the degree of mobility from the region to the center, the extent to which a local counter-elite becomes mobilized but not assimilated, the presence or expectation of external aid, prospects for positive economic development, the alignment of religious, family, racial or other bases of solidarity, etc.

Even though regional particularism never becomes strong enough to lead to revolt, it will surely result in manifestations of hostility and resentment toward the center. The national elite cannot help but resent the continuing drain on its resources and the "ungrateful" clamor for more autonomy. There develops then an acute ambivalence in the attitudes of both internal and external clienteles of local government.[11]

The internal clientele regards its members in the national government as basically spokesmen for its parochial wishes--hence the intense demand for patronage, pork barrel, and other forms of favoritism. At the same time local spokesmen loudly attack the center for its niggardliness and resist its controls, demanding "autonomy," by which they mean the right to get and spend central government funds.

The external clientele, for its part, insists on local governments carrying out projects and implementing goals determined in the center, but protests against the perennial demand for funds and, in the futile hope that localities could finance their own services, gives lip service to the slogans of local autonomy.

Incompatibility of clientele interests, then, produces a fatal fascination whereby center and localities are drawn into an ever tighter, and more oppressive, embrace. Both parties proclaim their desire to break the embrace, but these protestations must be considered as more largely wishes than effective demands. Like wrestlers, they have locked each other in a fearsome grip from which neither can escape.

We cannot conclude, here, however, for the basic theme of this paper has been that a solution to this problem, created by the vicious circle of negative development, can be broken. To break this circle requires a reversal of the trend of circular causation from negative to positive development. We terminate this essay, therefore, with a few thoughts about how to work toward this goal.

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11. The same ambivalence marks relationships between an "underdeveloped" country and any industrial country with which it has very close economic relationships.

VI. Toward an Action Program

It is already apparent from the work of government agencies, such as the PACD, Bureau of Agricultural Extension, Reconstruction Bank, Social Welfare Administration, Bureau of Public Schools, and many many more, that the investment of external aid in developmental projects in a locality can reverse the trends of negative development, and spur the local population to greater productivity. Private investments and private non-profit and philanthropic effort, such as that of the Philippine Rural Reconstruction Movement, or a school, such as Xavier University in Cagayan de Oro, can also begin to reverse long-established backwash effects.

The greatest difficulty encountered by these efforts is caused by the limited volume of resources available to finance and staff them. Everywhere the same lament--lack of funds--is heard. But this difficulty cannot readily be overcome--certainly not until the processes of positive development become more firmly rooted.

Hence the immediate and urgent problem for Philippine economic development is to make the most productive possible use of the few resources which are available--the effect of every peso spent should be maximized. Efforts to accomplish this objective can be more successful if the full potentiality of local administration as a reinforcing factor is recognized.

A. Coordination

First of all, the fact that regional developmental projects are being launched predominantly from a single base in Manila creates extremely great problems of coordination. The need to channel so many communications back to Manila in order to effect action in a locality--as evidenced by the deluge of mayors, governors and other local officials which is daily apparent in Manila offices, and most urgently of all in the highest office of the land--acts as a huge brake on effective use of available resources.

Better local coordination could be achieved through strengthening certain local administrative mechanisms, especially in provincial, municipal, and city governments, without raising the question of autonomy. Not only could more rapid decisions be made, but the work of agencies could be better integrated and, equally important, major bottlenecks to development--due to the weakness of some existing services--could be uncovered. For example, the present inadequacy of commercial and credit aspects of regional development would be uncovered and steps might be taken to remedy this major stumbling block which greatly reduces incentives to farmers to make use of opportunities already open to them to raise agricultural productivity. The PACD has shown that considerable improvement in coordination can be achieved, under present conditions, in applying available services to the rural community. The same kind of effort is needed to bring about better coordination at higher levels of local government.

B. Priorities

Secondly the question of regional priorities for developmental efforts needs urgent consideration. Even with the best possible coordination of efforts, it is still going to take a long time to reverse backwash effects throughout the country and bring all local communities to the level of self-sustaining growth. Hence the developmental impact of available resources could be increased if they were concentrated on priority areas.

The selection of these areas should be determined by their growth potential, i.e. their promise of becoming self-sustaining, in a short time. As a region becomes self-sustaining, national support would be reduced and shifted to other areas where the chances of self-support seem most likely. This kind of approach has already been tried on a de facto basis in such programs as Community Development and the Rice and Corn Program. But it needs extension on a systematic, over-all basis involving inter-agency coordination and national planning.

The model of selective support taken from industrialized countries is particularly misleading at this point. There, as in the United States, national aid is chiefly extended to the most depressed and backward regions. This is justified because most regions have already become self-sustaining and have less need for national assistance. Hence central policy is based on an attempt to bring the remaining zones of negative development up to the general average.

In a country where negative development and backwash effects are widespread, however, resources spent in the most depressed regions will not only show minimal returns per peso invested (they will, of course, show some returns) but in the long-run will probably not be able to achieve self-sustaining growth--the Dependent elements are too powerfully entrenched and population pressures too great. The same investment placed in regions of greatest promise, however, will bring maximal returns and in a few years the burden of national aid can be reduced as local initiative and productivity takes over.

C. Obstacles

In such a planning process certain major difficulties must be frankly faced--and these are difficulties which can only be met through reliance on local government.

The first difficulty is the problem of "politics" in choosing areas for investment. The "pork barrel" psychology, based on the prevalent particularistic type of politics, which is closely-linked with powerful Dependent elements in the economy, requires the distribution of aid on a per capita basis. This is reflected in the national allotment system as well as in the public works appropriations.

But this approach automatically favors the most depressed rather than the most promising regions, since it is precisely the problem of excess density of population in rural zones utilizing traditional technology which contributes most to the phenomena of negative development (high rents and interest rates, landlordism and usury). It is in the underpopulated areas where new land is

available for settlement that the growth potential is greatest but aid, on a per capita basis, is most inadequate.

Considering the power of Dependent elements in national politics it may be all but impossible to push through national development programs which favor the most promising rather than the most depressed regions. Some way of overcoming this obstacle must be found.

One of these ways seems to be an incentive system for local government. The United States has developed such systems through its grant-in-aid program, and a similar idea has been utilized by PACD in the concept of "challenge" provinces. Under such schemes those who meet certain specified requirements are given augmented aid plus considerable independence in the use of this aid.

A law can be enacted whereby any localities that meet specified standards and conditions can have more self-rule. The standard must be high and clear cut. No question of favoritism or "politics" need arise, provided administrative machinery for impartial determination can be established, and the criteria established for the grant of assistance are sufficiently objective.

It is impossible in this essay to spell out specific criteria and methods for administration of such a program. A great deal of study and experimentation is first necessary. But the objective would be to combine analysis of political, economic and administrative factors in devising a system which would accelerate positive development processes in self-selecting localities.

D. Interdependence

It is apparent that such a process would require effective local administration and at the same time strengthen such local government. Hence the circular causation process would be reversed--better local administration would both stimulate and result from economic growth, moving step by step toward local autonomy.

This leads to our final point. A major present obstacle to turning more responsibility over to local governments is their weakness and their particularistic, ascriptive and unassimilated social foundations. For self-sustaining economic growth it is apparent, from our whole line of reasoning, that strong local self-government is a prerequisite. In this we fully endorse the opinions of Dr. Lewis. But the processes of growth which lead to autonomy involve economic and social changes as well as administrative and legislative changes.

Whenever development is viewed and planned primarily in terms of the economic sector or the administrative sector, the results are sure to be disappointing. One cannot delay administrative reforms until after economic growth has become self-sustaining. Indeed, a depressed region cannot become self-sustaining on this basis since, as we have seen, self-government is an essential ingredient of the economic growth process.

Hence steps to raise local administrative levels must be taken concurrently with steps to spur economic development. This can only be accomplished through programs designed to give communities progressively more self-rule as they develop, and which provide incentives for such progress by making the opportunity and assistance needed for both administrative and economic growth contingent on decisions taken locally rather than in the capital.

How such a program can be devised remains a subject on which all too little thought has yet been given. It remains a major and fundamental topic for research, experimentation, and public debate.

THE MEASUREMENT OF ECONOMIC DEVELOPMENT

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Introduction

At the present time it is generally estimated that about two-thirds of the world's population lives in countries that can be described as economically backward or economically underdeveloped.[1] Furthermore, it is generally accepted that the chronic poverty, and resulting from this the substantially inferior levels of consumption and material well-being that characterize the majority of the world's people, represents one of the major problems, if not the major problem, facing the human race today; and it is a problem that will become increasingly evident in the immediate future.[2] In view of their critical importance, it follows that a good definition of what constitutes an underdeveloped country is needed. Particularly, it would seem desirable to have a means of classifying countries in terms of their stage of economic development--both to facilitate locating the position of particular countries in relation to one another at a given point in time, and to permit the measurement of economic progress in various countries over time.

In general, where empirical measures have been used, the tendency has been to view the degree of economic development in a given country in terms of per capita output or per capita income.[3] Under ideal conditions, it is a relatively simple matter to use per capita income as a means of measuring and comparing countries in terms of their economic status; however, as has frequently been pointed out, the data necessary for such comparisons are, at best, extremely inadequate for large parts of the world. Although statistics relating to national income, industrial and agricultural production, employment, transportation and communication facilities, etc. are generally available in the economically advanced countries of the world, such information is usually quite deficient or even entirely absent in the less developed nations. As a matter of

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1. Douglas F. Dowd, "Two-Thirds of the World," reprinted in L. W. Shannon, ed., Underdeveloped Areas, Harper and Bros., New York, 1957, pp. 12-21.

2. Lyle W. Shannon, ibid., p. 1.

3. Harvey Leibenstein, Economic Backwardness and Economic Growth, New York, John Wiley & Sons, 1957, Ch. 2.

fact, it has even been suggested that the absence of such statistics may itself be an indicator of economic underdevelopment. [4]

In view of the inadequacy of such direct measures of economic development, it is necessary to place heavy reliance on indirect measures. In a recent article, Philip Hauser has suggested that the use of various population statistics, which are becoming increasingly available, provide such indirect indices of economic development. [5] It is the purpose of the present paper to explore the suggestion that demographic measures be employed as indicators of economic development, to try and isolate some of the population variables that may be related to economic development, and, finally, to examine several of these variables in an attempt to develop a valid index of economic development based on demographic characteristics.

Demographic Indicators of Economic Development

The population statistics which Professor Hauser proposes as indicators of economic development may be summed up under the following headings: (a) population growth; (b) population composition; (c) components of population change; (d) the distribution of population; and (e) various interrelated indices (which also require data of a strictly economic nature, such as total national income, for their construction). [6] This paper will be concerned with the third item, components of population change; more specifically, it will be concerned with measures of fertility and mortality as they are related to a nation's economic level.

The decision to focus solely on these two demographic measures can perhaps best be explained by discussing the reasons for neglecting alternative measures. In the first place, it was felt that phenomena such as population composition and the rate of population growth would be reflected in the levels of fertility and mortality prevailing in a country at a given time. Secondly, although such phenomena as internal migration and distribution of population (e.g., the degree of urbanization), may be useful indicators of a nation's economic level, the data necessary for including them in the analysis are generally very inadequate when compared with those which exist for fertility and mortality. Similarly, other interrelated indices were neglected simply because the economic data necessary for their construction are also generally inadequate. Thus, the desire to make the index as composite as possible and the question of the availability and accuracy of the data were the basis for the decision to focus solely on the two vital processes of birth and death. Even for these processes, however, a great variety of measures may be used: e.g., crude death rates,

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4. Philip M. Hauser, "Population Statistics and Research in Planning Economic Development," Proceedings of the World Population Conference: 1954, New York, United Nations, 1955, V, pp. 927-942.

5. P. M. Hauser, "Demographic Indicators of Economic Development," this journal, VII, 2, 1959, p. 98.

6. Ibid., p. 100.

life expectancy at birth or other specified ages, crude birth rates, general fertility ratios, infant mortality, and neonatal mortality, to name just a few. For the purposes of the present undertaking, the available data required that the analysis be confined to the following three measures: the crude death rate, the crude birth rate, and the infant mortality rate.[7]

1. Crude Death Rate. It is generally agreed that the crude death rate constitutes one of the best indicators of a nation's level of economic development. Historically, it has been shown that a decline in the crude death rate has been highly correlated with economic growth.[8] Evidence of this correlation today can be seen in recent estimates which show an average crude death rate of 10.3 per 1,000 for those countries whose annual per capita income exceeds $500, in contrast to a rate of 11.5 for those countries whose annual per capita income is less than $500. Although the difference is quite small, it nevertheless serves to indicate the nature of the relationship that has generally been observed between mortality and the level of economic development.

2. Crude Birth Rate. Similarly, the economic development of the more advanced nations of the world was, with some lag, accompanied by corresponding declines in fertility.[9] That relatively low levels of fertility are still closely related to high levels of economic development can be seen by the fact that those countries having an annual per capita income of $500 or more have an average crude birth rate of 19.8 per 1,000 as opposed to a rate of 31.5 in those countries having a per capita income of less than $500.

3. Infant Mortality. Historically, the decline in infant mortality has been so marked once a nation begins to undergo economic growth that the infant death rate has been called the most sensitive index of economic welfare that we possess; and it is frequently used to compare countries in terms of economic status.[10] The extremely close relationship between infant mortality and economic development is clearly brought out by the fact that the average infant mortality rate for countries having an annual per capita income of less than $500 is 91.8 per 1,000 in contrast to the rate of 28.8 for the more highly developed countries whose annual per capita income exceeds $500.

On the basis of the preceding evidence it would seem that any one of these three measures could be used to give a rough indication of a nation's relative economic status. However, it can be demonstrated that sole reliance on

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7. Unless otherwise indicated, the population data and per capita income figures cited in the following discussion of these three rates have been derived from Hauser, ibid., Table 1, pp. 102-103.

8. United Nations, The Determinants and Consequences of Population Trends, New York, 1953, p. 56.

9. Kingsley Davis, "The World Demographic Transition," The Annals of the American Academy of Political and Social Science, 237, 1945, pp. 1-11.

10. Dennis Wrong, Population, New York, Random House, 1956, p. 38.

any one of them can be very misleading. In the first place, although a decline in the crude death rate has been closely associated with economic growth in the more advanced nations of the world, recent trends indicate that this relationship may be breaking down. Today, the introduction of relatively simple public health and modern sanitation measures can drastically reduce death rates without any substantial increases in the level of economic development.[11] For example, the latest available figures indicate that nearly all of the countries of Central America have crude death rates as low, if not lower, than those currently prevailing in the United States.[12] No one, however, is going to be so naive as to suggest that their level of economic development compares with that of the United States.

Secondly, the rise in the birth rate and its continuation at a relatively high level as an aftermath of the post-war "baby boom" in some Western nations, coupled with attempts to reduce fertility in many of the less developed countries, has resulted in some of the more advanced nations having a crude birth rate that is higher than those prevailing in many of the underdeveloped countries. The fact that the crude birth rate of Japan (17.2) is substantially lower than that of the United States (25.0) cannot be taken as an indication that Japan has achieved a higher level of economic development.[13]

The problem raised by the preceding phenomena may be partially solved by considering fertility and mortality levels together. For example, although their crude death rates may be close to that currently prevailing in the United States, nearly all of the Central American countries have crude birth rates approximately twice as high as that of the United States.[14] However, this does not provide a complete solution--as the case of the Philippines clearly indicates. Recent estimates here show crude birth and death rates of 24.4 and 9.2 per 1,000 respectively as compared to rates of 24.9 and 9.4 in the United States. Relying solely on these two measures as indicators of economic development would lead one to conclude that the economic levels of the United States and the Philippines were approximately equal; but viewing them in conjunction with a per capita income of $150 for the Philippines as opposed to $1,870 for the United States sharply points out the existing economic differences between the two countries.

It would thus seem evident that neither fertility nor mortality, nor a combination of the two, can be used with complete confidence as an indicator of relative economic development. In addition, it can be demonstrated that infant mortality, although it is generally considered to be the most sensitive index of

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11. George J. Stolnitz, "The Revolution in Death Control in Nonindustrial Countries," The Annals of the American Academy of Political and Social Science, 316, 1958, pp. 94-101.

12. United Nations, Population & Vital Statistics Reports, A, XI, 1, 1959, p. 13.

13. Ibid., pp. 13 and 19.

14. Ibid., p. 13.

a nation's economic level, if used by itself, can likewise be misleading. Consider the case of Japan, for example, with an infant mortality rate of 40.7 per 1,000 and a per capita income of $190 in contrast to Belgium with an infant mortality rate of 45.7 and a per capita income of $800.

The preceding observations suggest the conclusion that, although crude birth and death rates and infant mortality rates have historically been highly correlated with economic growth, and although there is still a general tendency for them to be related to a nation's economic level, no one of these measures will of itself suffice as an unambiguous indicator of economic development. The question to be faced now is: Which of these measures, used singly or in some combination, represents the best indicator of economic development? It is to the task of answering this question that the remainder of the present paper is devoted.

Methodological Considerations

In a recent publication, Shevky and Bell have outlined a procedure for classifying census tracts according to socio-economic status in terms of occupational and educational composition.[15] It is felt that the methodology of this procedure can easily be adapted to the construction of an index of economic status based solely on the three demographic measures of the crude birth rate, the crude death rate, and the infant mortality rate. Next, using availability of data as the major criterion, it was decided to adopt 1949 as the year upon which to base the necessary calculations. Although reasonably accurate data on vital rates are available through the offices of the United Nations for much later dates,[16] national per capita income statistics--with which to measure the validity of the index--were more readily accessible to the author for 1949 than for any other year.[17] On the basis of the combined availability of the necessary data, then, thirty countries were selected in such a manner that every continent and the complete range of per capita incomes (from $40 per year in Ecuador to $1,453 per year in the United States) would be represented.[18]

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15. Eshref Shevky and Wendell Bell, Social Area Analysis, Stanford, Stanford University Press, 1955.

16. United Nations, Demographic Yearbook: 1957, New York, 1957.

17. Walter Isard and Vincent H. Whitney, Atomic Power: An Economic and Social Analysis, New York, The Blakiston Co., 1952, Table XXVI, p. 166.

18. The countries selected for inclusion in the index were: Argentina, Australia, Austria, Belgium, Canada, Chile, Czechoslovakia, Denmark, Ecuador, Egypt, Finland, France, Hungary, India, Italy, Japan, Mexico, Netherlands, New Zealand, Norway, Pakistan, Philippines, Poland, Portugal, Sweden, Switzerland, United Kingdom, United States, Venezuela, and Yugoslavia.

Following the Shevky-Bell procedure, standard scores for the three basic components were computed for each of the thirty countries by the formula:

$$s = x(r - o)$$

Where:

s = the standard score for a particular measure
r = the measure in question
o = the lower limit of the measure in question
$x = \dfrac{100}{\text{range of the measure in question}}$

By then taking these standard scores, and the arithmetic means of their various combinations, it was possible to derive seven potential indices of economic development (Table 1). For convenience, these seven indices may be identified as follows:

B - index based on crude birth rate

D - index based on crude death rate

I - index based on infant mortality rate

BD - index based on the arithmetic mean of the standard scores of the crude birth and death rates

BI - index based on the arithmetic mean of the standard scores of the crude birth rate and the infant mortality rate

DI - index based on the arithmetic mean of the standard scores of the crude death rate and the infant mortality rate

BDI - index based on the arithmetic mean of the three sets of standard scores

In order to determine which of these seven demographic indices was the "best" indicator of economic development, each of them was correlated with the 1949 per capita income estimates for the thirty countries in question. Since the general historical tendency has been for these measures to be inversely related to a nation's level of economic development, it was hypothesized that the index having the highest negative correlation with annual per capita income would be the "best" demographic indicator of economic development. The

Table 1. Demographic Indices of Economic Development on Crude Birth and Death Rates and Infant Mortality Rates for 30 Selected Countries, 1949

			Demographic Indices*				
Country	B	D	I	BD	BI	DI	BDI
Argentina	30	7	33	19	32	20	24
Australia	23	11	2	17	12	6	12
Austria	0	38	39	19	20	39	26
Belgium	3	38	26	22	14	32	22
Canada	38	10	15	24	27	12	21
Chile	63	74	100	68	82	87	79
Czechoslovakia	21	30	45	26	33	38	32
Denmark	9	6	9	8	9	7	8
Ecuador	100	73	70	86	85	71	81
Egypt	88	100	85	94	87	93	91
Finland	34	25	19	29	26	22	26
France	17	46	28	31	22	37	30
Hungary	15	26	52	41	33	39	31
India	35	62	76	48	55	69	57
Italy	14	19	39	17	26	29	24
Japan	57	28	30	42	43	29	38
Mexico	98	76	63	87	81	70	79
Netherlands	26	0	3	13	24	1	9
New Zealand	34	10	5	22	19	8	16
Norway	11	7	3	9	7	5	7
Pakistan	8	33	80	20	44	56	40
Philippines	17	30	65	23	41	48	37
Poland	45	28	64	37	55	46	46
Portugal	32	48	69	40	51	59	50
Sweden	4	15	0	10	2	8	6
Switzerland	7	21	8	14	8	15	12
United Kingdom	2	29	7	26	5	18	13
United States	26	13	6	19	16	9	15
Venezuela	86	30	51	58	68	41	56
Yugoslavia	48	43	60	45	54	52	50

* Rounded off to the nearest whole number

resulting correlation coefficients (Table 2) suggest that--although no single index is a completely unambiguous indicator of economic development--infant mortality is by far the best demographic measure at our disposal for use in determining a nation's relative level of economic development.

Table 2. Pearsonian Correlation Coefficients for Per Capita Income with Seven Demographic Indices, 1949

Index	Correlation Coefficient
B	-.415
D	-.592
I	-.801
BD	-.550
BI	-.693
DI	-.742
BDI	-.687

The Validity of Infant Mortality As an Indicator of Economic Development

Theoretically, if the infant mortality index and annual per capita income are comparable indicators of economic development, there should be a perfect negative correlation between them. However, although the correlation coefficient of -.801 is far from perfect, it seems sufficiently high to justify the use of infant mortality as a basis for classifying countries into broad groupings in terms of their relative levels of economic development. For purposes of testing this hypothesis, the infant mortality index was used to classify the thirty countries into three broad categories as follows:

Group I - Those countries which are the most highly developed as reflected by an infant mortality score of less than 25 (Sweden, Australia, Netherlands, Norway, New Zealand, United States, United Kingdom, Switzerland, Denmark, Canada, and Finland).

Group II - Those countries which are well on their way toward attaining a relatively high level of economic development. These countries have an infant mortality index ranging between 25 and 49 (Belgium, France, Japan, Argentina, Austria, Italy, and Czechoslovakia).

Group III - Those countries among the thirty considered here which have made the least progress toward economic development, and that are characterized by an infant mortality index of 50 or more (Venezuela, Hungary, Yugoslavia, Mexico, Poland, Philippines, Portugal, Ecuador, India, Pakistan, Egypt, and Chile).

The validity of the preceding classification can be seen in Table 3, which shows a marked inverse relationship between the three economic status groups and the average per capita income of all the countries within each group. Those countries falling into Group I have an average annual per capita income that is over twice as high as that characterizing Group II countries, and nearly five times that found in the underdeveloped countries of Group III.

Table 3. Average Per Capita Income (in United States Dollars) in Three Groups of Countries Classified According to Infant Mortality Index

Economic status group	Average per capita income
Group I	$762 (11)[a]
Group II	$333 (7)
Group III	$157 (12)

Source: W. Isard and V. H. Whitney, Atomic Power: An Economic and Social Analysis, New York, The Blakiston Company, 1952. Adapted from Table XXVI, p. 166.

a. Values in parentheses indicate the number of countries on which the averages are based.

Additional validation of this classification can be obtained by relating it to other phenomena that are known to be associated with a nation's level of economic development. For example, it has long been known that the daily energy intake in the form of food is much lower in those countries that are generally considered to be economically underdeveloped.[19] Table 4, which shows the average per capita daily calorie intake in recent years for various countries falling into each of the three broad groups, clearly indicates the marked differences in food consumption that characterize the different levels of economic development. If it is true, as one author has noted, that the daily food intake required to support a human being adequately is approximately 3,000 calories,[20] then only those countries in Group I can be said to be providing an adequate level of nutritional well-being for their populations.

Another commonly used index of the level of socio-economic development is the extent of literacy in the population of a given country.[21] As a matter of fact, a high degree of literacy is generally regarded as a prerequisite for economic development.[22] Thus, the correspondence between the extent of literacy

19. Harrison Brown, The Challenge of Man's Future, New York, The Viking Press, 1954, Ch. IV, pp. 107-112.

20. Ibid., p. 149.

21. Hilda H. Golden, "Literacy and Social Change in Underdeveloped Countries," Rural Sociology, XX, 1, 1955, pp. 1-7.

22. Kingsley Davis, The Population of India & Pakistan, Princeton, Princeton University Press, 1951, p. 150.

Table 4. Calorie Consumption, Literacy, and Urbanization in Three Groups of Countries Classified According to Infant Mortality Index

Economic status group	Average daily per capita calorie intake[a]	Average per cent of the population over 15 that is literate[b]	Average per cent of population in places of 20,000 or more[c]
Group I	3,189 (11)	98.2 (11)	43.3 (9)
Group II	2,747 (7)	94.4 (7)	43.0 (4)
Group III	2,293 (8)	56.1 (12)	21.9 (8)

Sources: a. U. S. Bureau of the Census, Statistical Abstracts of the United States: 1958, Seventy-ninth edition, Washington, 1958. Adapted from Table 1184, pp. 927-928.

b. United Nations, Report on the World Social Situation, New York, 1957. Adapted from Appendix A, pp. 79-86.

c. Ibid. Adapted from table on page 115.

and the infant mortality index seen in Table 4 would again seem to support the validity of infant mortality as an indicator of relative economic development. Although the difference is relatively small between Group I and Group II countries, their level of literacy is substantially higher than that characterizing the underdeveloped countries of Group III.

Still another phenomenon that is generally associated with underdeveloped countries is a relatively slight degree of urbanization. Although the absolute number of persons living in urban places is quite large in most underdeveloped countries, the proportion of the total population living in cities is extremely low when compared to that of the more highly advanced countries.[23] Once gain, although the difference between Group I and Group II countries is small, the data presented in Table 4 show that the degree of urbanization in countries classified as underdeveloped in terms of infant mortality is substantially lower than in the more advanced countries.

Economic Development and Industrialization

It is generally accepted today that perhaps one of the most significant indicators of a nation's level of economic development is the extent of its industrialization.[24] Additional validation of the infant mortality index as an indicator

23. United Nations, Bureau of Social Affairs, Report on the World Social Situation, New York, 1957, pp. 113-118.

24. Kingsley Davis, "Population and the Further Spread of Industrial Society," Proceedings of the American Philosophical Society, 95, 1, 1951, pp. 8-19.

of economic development should therefore be obtained by relating the index to various measures of industrialization. One such useful measure of industrialization, it would seem, is the amount of steel consumed annually by a given country. In Table 5 it can be seen that the Group I countries consume, on the average, approximately six times as much steel per person as do the underdeveloped countries of Group III, and substantially more than the average per capita consumption in Group II countries.

Table 5. Average Annual Per Capita Steel Consumption (in Pounds), and Occupational Composition of the Labor Force in Three Groups of Countries Classified According to Infant Mortality Index

Economic status group	Average per capita steel consumption[a]	Average per cent of the labor force in agriculture[b]	Average per cent of the labor force in industry[c]	Average per cent of the labor force in manufacturing[d]
Group I	687 (11)	15.2 (6)	39.7 (6)	27.0 (8)
Group II	441 (7)	31.0 (6)	34.8 (6)	22.7 (4)
Group III	117 (10)	69.9 (4)	11.7 (4)	6.3 (7)

Sources: a. U. S. Bureau of the Census, Statistical Abstracts of the United States: 1958, Seventy-ninth edition. Adapted from Table 1189, pp. 937-938.

b. United Nations, Report on the World Social Situation, New York, 1957. Adapted from Table 1, p. 92.

c. Ibid.

d. Ibid. Adapted from Table 11, p. 127.

Perhaps the most significant measure of a nation's industrialization, however, is the occupational composition of its labor force. As has frequently been pointed out, the underdeveloped areas of the world are characterized by an agricultural economic base, with the vast majority of the economically active population engaged in agricultural pursuits.[25] Once again, the data substantiate the hypothesis that infant mortality is a valid index of relative economic development. On the one hand, Table 5 shows a marked inverse relationship when the three economic status groups are examined in terms of the proportion of the economically active labor force that is engaged in agricultural occupations. The proportion of the labor force in agriculture in the underdeveloped countries of Group III is approximately twice as great as the corresponding proportion for Group II countries; and the proportion for Group II is, in turn, slightly over twice that of Group I.

25. Ibid. See also K. Davis and H. H. Golden, "Urbanization and the Development of Pre-Industrial Areas," this journal, III, 1954, pp. 6-24.

On the other hand, Table 5 shows a direct relationship between economic level and the proportion of the labor force engaged in industrial and manufacturing activities. Although the difference between Group I and Group II is again small, the proportion of the labor force in non-agricultural industry in Group I countries is approximately three times that to be found, on the average, in the countries of Group III. Similarly, the proportion of the industrial labor force that is engaged in manufacturing activities is four times as high in Group I as it is in Group III.

Limitations in the Presentation

Before moving on to a summary statement, there are two major sources of bias in most of the preceding tables that should be pointed out. The first arises from the fact that the data used in comparing the three economic status groups were often not available for all the countries in each group. For example, the relationships pertaining to the agricultural and industrial composition of the labor force indicated in Table 5 were based on only 16 countries for which the necessary information was available. If all 30 countries were included, the picture might have been somewhat different. On the other hand, the inclusion of all 30 countries might have intensified the differences, particularly the small differences frequently observed between Group I and Group II. This is, of course, idle speculation, and all that can really be said is that the lack of data for all countries may, in some cases, be a source of error. However, the fact that several variables, on which data for all or very nearly all of the countries were available (e.g., per capita income, literacy, steel consumption, and daily calorie intake), showed a marked relationship to infant mortality suggests that errors arising from this source may be very slight.

The second source of error is more serious, and has to do with methodology. In computing the "averages" that appear in the preceding tables, no effort was made to control for differences in population size. For example, if there were two countries with annual per capita incomes of $1,000 and $800 respectively, the average of the two countries was taken as $900. However, suppose the first country had a population of 50,000 as opposed to a population of 10,000 in the second. If these population differences were taken into account, the two countries together would have an average per capita income of $967. Computing averages without proper weighting in terms of population size biases the outcome in favor of the smaller country. In the preceding hypothetical illustration, failure to consider differences in population size resulted in an average that was much nearer the per capita income of the smaller country than that which really exists when the two countries are taken together. However, here again, there is evidence that errors arising from this course of bias may not harm the results. To illustrate with per capita income, the Group I countries having the highest per capita incomes also tended to have the largest populations. For example, those countries having a per capita income in excess of $800 (e.g., United States, Canada, Switzerland, and New Zealand) accounted for 81 percent of the population in all of the Group I countries combined.[26] Similarly, within Group III, countries having the lowest per capita incomes tended to

26. The 1949 population estimates used in calculating these percentages were obtained from: United Nations, Demographic Yearbook: 1957, Table 3, pp. 124-135.

have the largest populations. In this instance, the four "poorest" countries (i.e., India, Pakistan, the Philippines, and Ecuador all had annual per capita incomes of less than $60) accounted for 82 percent of the population of Group III countries.[27] Thus, weighting per capita incomes in terms of population size would only serve to intensify the differences observed in Table 3. Moreover, although the actual computations were not carried out, a similar observation may be made for several of the other variables, such as daily calorie intake, literacy, and per capita steel consumption. Thus, what error there is would seem to be biased in favor of the preceding analysis.

Another minor source of bias may arise from the fact that, although the infant mortality index was based on 1949, it was frequently necessary to rely on other years for data on many of the variables used in the analysis. However, since every attempt was made to stay as near 1949 as possible, it is felt that this is a relatively minor problem, and that one or two years on either side would not make much difference in the relationships observed.

On the whole, even though the absence of data in many instances, coupled with the neglect of the population size factor in computing the averages, represent two potential sources of error of unknown magnitude, it appears that sufficient evidence exists to justify regarding these sources of bias as negligible as far as effecting the results of the analysis is concerned.

Summary and Implications

One of the most important questions confronting the world today is undoubtedly the problem of the development of the economically retarded areas. This is clearly evidenced by the continually growing body of literature dealing with the question of economic growth in the world's underdeveloped countries. Moreover, as interest in the relative economic position of the nations of the world increases, it is to be expected that continuing attempts will be made to devise means for measuring existing economic differences and changes in these differences over time. Although there is no adequate substitute for the direct measurement of economic development, the relative deficiency of the basic economic data in many of the less developed areas, and the probability that it will remain deficient for several years to come, make such direct measurement exceedingly difficult if not altogether impossible. Therefore, for the present, interested persons will have to rely heavily on indirect measures of economic development.

The general thesis of this paper is that the increasing availability of population statistics provides a convenient set of data which may be useful in constructing indirect indices of economic development. Of the several demographic indices examined, infant mortality was found to have the highest correlation with annual per capita income. Moreover, when countries are divided into broad economic status groups on the basis of the infant mortality index, an extremely good fit was found in relation to other factors that are

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27. Ibid.

known to be associated with specific levels of economic development. It must be remembered, however, that there are other demographic measures--not examined here--which have a close relationship to economic development: e.g., percentage of the population over 65, and life expectancy at birth;[28] and it is quite possible that a consideration of some of these other factors might produce an even better index. Furthermore, the use of standardized instead of crude birth and death rates might also produce a better index. However, when its historical sensitivity is considered along with the question of the availability of comparable data for the greatest number of countries, infant mortality seems to provide us with the best indirect measure of a nation's level of economic development. The evidence presented here would seem to justify its continued use as an indirect measure of economic development until such time as the data necessary for direct measurement become more readily available.

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28. Hauser, "Demographic Indicators of Economic Development," op. cit., p. 116.

BUILT IN DESTABILIZATION: A. O. HIRSCHMAN'S STRATEGY OF ECONOMIC DEVELOPMENT

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Alfred Marshall introduced his Principles of Economics by inscribing "natura non facit saltum" on the title page. His book is a monument to an era in which our world was widely viewed as being regulated by continuity and for which a policy of laissez faire; laissez alle was deemed appropriate in most worldy affairs, social and economic ones included. But in today's world of atomic fission and fusion, of orbits and escape speeds, and of population explosions and Soviet triumphs over their environment we have increasingly come to regard our world as one of discontinuities. Or, at any rate, we have discovered that even where discontinuities do not occur naturally they can be man made. Albert Hirschman's thinking appears to be a product of this emerging Weltangschaung; and The Strategy of Economic Development which he advances is designed both to take account and advantage of discontinuities which may, or may be made to, interrupt an otherwise continuous world. [1]

Hirschman's fundamental strategy of economic development is, in this reviewer's view, continually to build destabilizers or disequilibria into the economy and then to rely on their equilibrating forces to move and keep moving the economy off dead center. The disequilibria serve as inducement mechanisms, as he calls them; and the equilibrating forces provide "linkages" across the discontinuities which have been interspersed between ranges of continuity. In underdeveloped economics anxious to grow in which, as Hirschman claims, the most scarce factor is the ability to make initiating decisions and to coordinate changing activities, these linkages serve as organizing mechanisms which abate this scarcity. Hirschman distinguishes between backward and forward linkages. Backward linkages are generally more compulsive in that they encompass the pressure which one sector of an economy exerts on a second to provide the inputs required by the former. Forward linkages are primarily permissive in that they include the usually weaker pressures that one sector can exert on another to utilize the output of the first. Hirschman suggests that market mechanisms, which may often be too sluggish for development purposes, can readily be supplemented or replaced by linkages available in various social and political institutions--political pressure on government officials, for instance; which are no less automatic than those of the market.

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1. New Haven, Yale University Press, 1958; xii & pp. 4. 50.

In examining some of the coordinating mechanisms Hirschman recommends, it will be convenient to distinguish among those which he recommends for use a) within firms, b) among firms, c) among industries or sectors, d) and those among economies or regions. To provide coordination internal to firms, particularly new ones, Hirschman recommends greater reliance on two kinds of machinery. (VIII)[2] Firstly, machinery which automates a critical portion of the production process can be used to pace productive activity in the remainder of the process, thus eliminating complete reliance for coordination on underdeveloped managerial skills and organization. Secondly, equipment which makes heavy maintenance demands if it is to work at all such as a fleet of airplanes exerts greater pressure toward the use of existing administrative resources than does a road network or fleet of trucks which paradoxically, is more likely to depreciate just because it can be left to depreciate gradually. The recommendation, in short, is to rely on more process--and less product centered industries. Though Hirschman does not say so, these devices are instances of providing for compulsive backward linkage in that "later stages" of the production process exert pressure on "earlier" ones to come into existence and be efficient. Both kinds of coordinating devices are, of course, highly capital intensive and thus subject to scepticism by those who would conserve scarce capital. But if organization is really the main impediment to economic development, as Hirschman contends it is, then the marginal productivity of, and the most important use for, scarce capital would appear to be to devote to the provision of these and other kinds of management and organization displacing and producing linkages.

Hirschman devotes most space to his discussion of built in destabilizers between sectors and between industries (III-VI). To develop his argument, Hirschman introduces the distinction between Social Overhead Capital (SOC) and Directly Productive Activities (DPA) (V). If at any time the services available from the SOC sector are just enough, no more no less, to be absorbed by the DPA sector, and vice versa, then, Hirschman argues, strong potential development producing mechanisms and forces go unutilized and economic stagnation is likely to occur. At the same time recalling the balanced growth argument, he suggests that this kind of balance between sectors is just what underdeveloped organization mechanisms do not permit underdeveloped countries to achieve anyway. Accordingly, true to his destabilization-disequilibrium strategy, Hirschman recommends that countries anxious for economic development go whole hog and provide for substantial inequality between SOC and DPA. This imbalance will call forth forces or create linkages often available in non-market socio-political mechanisms, which will narrow the gap between the two sectors by pulling or pushing the less up toward the more developed one. If DPA exceeds SOC, making for shortage of SOC, Hirschman expects political pressure which will result in increased provision of SOC. Such imbalance would be an instance of compulsive backward linkage. If SOC exceeds DPA, providing excess SOC capacity, Hirschman expects the resulting permissive forward linkage to promote increases of decentralized DPA to take advantage of that capacity. In either event, barring excesses which would debilitate the entire

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2. References to chapters are in Roman numerals; to pages in Arabic numerals.

economy, the imbalance would occasion development producing mechanisms or linkages.

In his examination of agriculture and industry Hirschman levels the criticism against investment in agriculture that it has already received at many other hands by pointing out that primary production, and subsistence agriculture in particular, is not blessed with many linkages. It lacks backward linkage by definition and provides few forward linkage effects because its commodities are not destined for substantial domestic processing; in underdeveloped countries in general and in "dual" or "enclave" economies in particular most of its output is either consumed directly or exported for processing elsewhere. Manufacturing, on the other hand, has backward linkages to primary production and forward linkages to tertiary production. Particularly favored by Hirschman's investment are intermediate industries which can provide both backward and forward linkages and "import enclave" manufacturers who begin by processing for domestic consumption semi-finished materials imported from abroad but thereby set up import replacing domestic backward linkages. Hirschman believes that forward linkages, being permissive only, cannot well be relied on by themselves. Beyond reliance on traditional investment criteria, his most favored strategy, therefore, is to combine forward and backward linkages in a series of mutually and continually destabilizing and reinforcing disequilibria resulting in economic development.

Hirschman extends his destabilization strategy as well to trade among economies (VII) seeking to further their economic development. And again his prescriptions turn out to be quite unorthodox. While recognizing the demerits usually ascribed to imports, Hirschman stresses the merits of imports for economic development. These merits arise directly out of the backward linkages to which they give rise. Additionally, they can be used to create, reconnoiter, and bring order into markets for the commodities in question where unstandardized and unscheduled domestic manufacture would fail to do so. Thus, if we accept Hirschman's destabilization strategy, it follows, as he points out, that there is a "prenatal" stage for many industries during which, not infant industry protection, but prenatal exposure seems to be called for.

In Mr. Hirschman's upside down world exports, then, turn out to be largely a means to the end of permitting destabilizing imports. Turning to interregional relations (X), Hirschman distinguishes between the trickling down effects of the more to the less developed region and the concomitant polarization effects, stressed by Gunnar Myrdal in his recent books,[3] which result in the rich getting richer and the poor poorer. Comparing interregional and international relations, Hirschman points out both trickling down and polarization effects are stronger under the former. He then proceeds to suggest that to maximize development by getting the best of both worlds, regions should for some purposes be given the equivalents of national sovereignty, while nations should accept some aspects of regional dependence.

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3. Rich Lands and Poor, New York; Harper & Brothers, 1957.
An International Economy, New York: Harper & Brothers, 1958.

Conspicuously omitted from Hirschman's recommendations are suggestions for improvement in the coordination of activities between firms (except insofar as he is discussing different industries). A possible explanation may be that he is satisfied with the performance of the market in coordinating activity between firms, though not within firms and between industries. One may wonder, however, whether this inferred satisfaction is the result so much of his examination of market performance of these various tasks or whether it stems more from the training, shared by Hirschman with all Anglo-Saxon economists, which emphasizes the virtues of market operation within an industry while almost entirely neglecting intra-firm and inter-industry coordination.

To summarize Hirschman's recommendations we may note that he emphasizes induced investment. But unlike the Keyneseans who introduced this term, he believes that such investment can best be induced not so much by consumption demand as by other investment. Furthermore, he believes that the multipliers of various kinds of investment differ; and he counsels that underdeveloped areas make their investment choices primarily in terms of maximizing multiplier-inducement and other linkage effects of investments rather than in terms of other criteria.

Let us now return to the attempt, begun in the opening paragraph, to place Hirschman's work in context and perspective. Hirschman largely contents himself without lining his strategy, and he does not try to show the reader either how it is derived from, or how it might contribute to, a theory of economic development. But since his strategy produces recommendations which are consistently out of keeping with both current non-Soviet type practice and theory, it seem important to this reviewer to make such an attempt at development theory. Fortunately for this task, Hirschman's work is consistent with the directions in which the present writer's thoughts are moving. At the same time, Hirschman may well not subscribe to all that follows.

The conceptualization of the world out of which Hirschman's strategy arises admits of discontinuities in the world, and the still unformulated theory of economic development toward which he makes an important contribution will be truly dynamic. Like Myrdal[4] and Leibenstein,[5] Hirschman recognizes that ranges of continuity are often discontinuous at particular values of otherwise gradual change is often interrupted by points of discontinuity at which change is very abrupt. Although Myrdal concentrates his interest on the disequilibrating changes on either side of these critical values, while Leibenstein emphasizes the equilibrium trap between them, both appear to think that these discontinuities occur in nature. They are joined in this view by physicists with subatomic and extraglobal concerns, by biologists concerned with critical population numbers beyond which species die out, as well as by social scientists, such as Simmel who long ago analyzed the critical difference between a dyad and a triad. Hirschman, however, confines his discussion to man-made discontinuities and proceeds to support their virtues for economic development.

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4. Gunnar Myrdal, op. cit.

5. Harvey Leibenstein, Economic Backwardness and Economic Growth, Ch. VIII.

Hirschman's book is a step toward dynamic theory in that, unlike the currently predominant practitioners of comparative statics, he is concerned not with the wayposts on the path of development but with the path itself. His strategy is to establish linkages between mileposts which create and define that path. If not the mileposts but the path itself is of principal importance, then, as Hirschman contends (78), not only the type and uantity but also the temporal order of investments is decisive for development. The dynamic theory toward which Hirschman is advancing will yield systematic recommendations of more and less suitable investment orders and therewith development paths.

Benjamin Higgins,[6] also a member of the avant-gaurde group in the development field, has recently argued that in a world of non-marginal discontinuities marginalism is inappropriate. Marginalists will be quick to challenge this contention, and the argument will turn on just where and how large the margin is. Instead of debating the virtues of marginalist theory, I believe we should question the utility of market organization for coordinating economic activity in a world of discontinuities. Recalling Alfred Marshall's title page contention that natura non facit saltum, marginalist theory teaches us that in a world of discontinuities, such as that of the kinky oligopoly demand curve, market organization is prevented by those discontinuities from generating determinate solutions. If we are really faced with a world of discontinuities, maybe we must rely for coordination on organizational mechanisms other than the market.[7] And very possibly, had Alfred Marshall thought that natura does facit saltum, he would have been the first to agree.

In pointing to the unlikelihood that balanced economic growth can in fact be achieved, Hirschman seems to recognize the inevitability of discontinuities. But as will be recalled, he goes farther than that and recommends the creation of discontinuities. And he suggests that for economic development to occur we must rely on these discontinuities and the linkages to which they give rise. At the same time he also argues that the sources of many of these linkages must be sought in non-market institutions. Thus, in his analysis, Hirschman seems to agree with the inadequacy of sole reliance on market organization for economic development which is advanced above. And his reference to non-market linkages point toward the construction of a theory of economic development organization which can handle ways of coordinating human activity well in excess of those of the market.

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6. Economic Development: Principles, Problems, and Policies, New York, New York: Norton and Co., 1959, ch.

7. The same implication may be inferred from Maurice Dobb's discussion of planning in the face of fixed or relatively invariable technical coefficients in his "A Review of the Discussion Concerning Economic Calculation in a Socialist Economy," reprinted as part of Chapter III in his On Economic Theory and Socialism. Unfortunately, while the market is not eminently suitable for planning, or better "programming," decisions in a world of discontinuities, the bureaucratic form of organization is not very suitable either. While a bureaucracy can more readily deal with existing discontinuities than a market can, the conservatism which is a direct result of bureaucracy's structure inhibits it from initiating and creating discontinuities, as Hirschman's strategy would require it to do.

Finally, we may hazard an examination of the very definition of economic development implied by Hirschman's treatment. A conception of economic development in which that term refers to a level (high income, resemblance to the "West," etc.) soon gave way to a conception of development as bridging a gap between a present lower and a future higher level. This conception resulted in the design of crash programs designed to get the economy from one level to the other. Some of the International Bank Reports are cases in point. According to a second conception, more recently current in the West, development seems to be viewed as a change in a certain direction; and most of the debate about definitions has centered on just what that direction is or ought to be, be it increased per capita income, sustained increases of the same, increasing or decreasing rates of increase, greater equality, or whatever, Hirschman's approach is consistent with this second conception, and his book can be taken as a strategy for economic development so conceived.

Yet Hirschman stands in disagreement with other writers in this tradition. While many of these are currently debating the relative contribution of law, labor, material capital, human capital, and technology to economic development, Hirschman's strategy, as we have seen it, sometimes explicitly at others implicitly, invariably emphasizes organization.[8] Moreover, Hirschman's argument in favor of organization is persuasive to the present reviewer, notwithstanding the latter's recent entrance into the above debate on the side of human capital.[9] Why this difference between Hirschman and the rest of us? The major reason is, I believe, that while most writers in this second tradition are asking and answering questions about the factors which contribute to economic development, Hirschman is concerned firstly with the path and secondly with the beginnings of economic development. This concern with the path, and particularly its early reaches, lead to his concern with the discontinuities of that path; and that, concern in turn, inevitably demands his preoccupation with the social organization necessary to create and take advantage of the discontinuities.

But Hirschman's book is consistent as well with a third conception of development, and of a Weltanschuang in general, which has less currency in the West than the approaches discussed above. And the fact that he chose to entitle his book not "A Strategy for Economic Development" but "A Strategy of Economic Development" suggests that he may subscribe to this third conception; that the strategy itself is economic development. In more general terms, changing or expanding the range of alternatives which face people does not itself constitute

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8. Kuznets, S., "Toward a Theory of Economic Growth," in Lekachman, E. (ed.) National Policy for Economic Welfare at Home and Abroad; Domar's and Cairncross' discussion in UNESCO, "Factors of Economic Progress," International Social Science Bulletin, VI (2, 1954); J. Brozen, "Invention, Innovation and Imitation," American Economic Review, May 1951; T. W. Schultz, "Reflections on Agricultural Production, Output, and Supply," Journal of Farm Economics, XXXVIII (August, 1956); M. Abramovitz, "Resource and Output Trends in the United States since 1870," American Economic Review, XLVI (May, 1956).

9. A. G. Frank, "Human Capital and Economic Growth," this journal, VIII, Jan. 1960.

economic development,[10] and such changes of alternatives occur not primarily (or maybe at all) within ranges of continuity but at points of discontinuity. Then, the very procedure of providing for discontinuities by building destabilization into the economy is economic development. In terms of this conception economic development need not be change toward some goal; the change itself is economic development. The very change constitutes the desired experience (though no doubt it is painful as well), and overriding goals are not necessary at all. In a word, it is not getting there but going that counts.

In this third context Hirschman's strategy will seem still more different from, and in my opinion useful than, that of contemporary Western social science. Why is it, as we have seen, that from the perspective of most of his colleagues Hirschman seems forever to recommend putting the cart before the horse?[11] The answer, I believe, should be sought not so much in the reason he supplies for his several separate recommendations as in the apparent difference between his and others' fundamental approaches. While Western social science remains (or is it just becoming?) positivist and while economists, in particular, are debating alternative means within their common means-ends schema, Hirschman seems to have forsaken both for an approach which is more consistent with American pragmatism and Marxian dialectic. Not unlike like pragmatists and dialecticians, he seems to have banished final ends and unambiguous goals from his perspective, even to have forsaked primary concern with goal achievement--getting there--at all, and to have fixed his eye instead on the path-the going--itself. Thus, however perverse his recommendation may appear from the perspective of contemporary western social science, it may well be that they flow consistently from another set of premises.

Finally, having appealed to a difference in approach to explain the novelty of Hirschman's strategy, we may well ask whether his approach and resulting strategy hold more promise than traditional ones. The answer of this reviewer is an emphatic, yes. Yet evidence and argument to support this judgment are not easily at hand. If the proof of the pudding is in the eating and unless we are content with the Russian pudding, we shall have to wait for history to supply this evidence. Some supportive argument might be sought in several directions. I am inclined to argue that our contemporaries really do care more about going than about getting there and that, for this reason among others, an approach which rests on paths rather than on means and ends may prove more desirable.[12] Moreover, both positivist theory of knowledge and of value--and the

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10. This rendition of economic development is similar to the position which cuts the Gordian knot of the freedom from-freedom to controversy by conserving of greater freedom as well as increased alternatives.

11. Recall, for instance, his recommendations to promote capital intensive investment such as airplanes (discussed on my pages 3-4), inequality between SOC supply and DPA demand (p. 4), and imports (p. 5).

12. My colleague, Charles Cumberland, a historian of contemporary Mexico, suggests that only this view permits him satisfactorily to understand the participation of the peasants in the 20th century economic development of that country.

means-ends approach with them--have proven unsatisfactory for many problems we have faced in the past, while more synthetic approaches are finding increasing favor in philosophy and elsewhere.[13] Additionally, students of decision making and organization are increasingly finding that approaches which assume the prevalence and/or desirability of "rational" pursuit of explicitly formulated and widely accepted social goals are no more, and possibly less, suitable for analysis and policy formulation in the world as we find it than are approaches, like Hirschman's, which abandon these assumptions.[14]

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13. See for instance Michael Polanyi, Personal Knowledge, London: Rutledge & Keegan, Ltd., 1958 and Gilbert Ryle, Dilemmas, Cambridge University Press, 1956.

14. See particularly Charles Lindblom, "Decision Making in Taxation and Expenditure," a paper delivered at a National Bureau of Economic Research Conference, April 10-11, 1959 (mimeographed); and also his "Policy Analysis," American Economic Review, XLVIII, June, 1958; and my own "Goal Ambiguity and Conflicting Standards: An Approach to the Study of Organization," Human Organization, 17, Spring, 1959, 8-14.

POPULATION AND PROGRESS IN THE FAR EAST*

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This book is the third of a series on population changes and their political consequences written by Professor Thompson over the course of the last thirty years. In it he assembles a host of facts regarding the populations and economies of the countries from Japan to Pakistan, from China to Indonesia. His data are up to the minute; they include the change to extra-constitutional governments in Pakistan and Burma during 1958; the financial difficulties encountered by India's Second Five Year Plan; the very recent decline of Japan's birth rate to three-quarters of that of the United States. He mentions China's "forward leap" of 1958 and expresses doubt about figures officially promulgated, such as that Chinese steel output doubled in one year.

Professor Thompson's compendium of facts in a wide variety of fields is worth summarizing here, for no one else has brought together so much material bearing on the two critical topics of population growth and economic development, material which he generated partly in travels and study in the field and partly in reading. The eighteen-page "Selected Bibliography" includes 352 items.

I

The first country to be taken up is Japan. The number of Japanese stood at 26 to 28 million through the 18th century, and rose slowly to about 30 million by the middle of the 19th century, a more or less stationary population living in a static society. The Meiji Restoration of 1868 released the energies of some of the samurai and landlords, as well as of certain groups of peasants, and started an impassioned process of economic development. Adopting the best of western techniques, equipment, and education, and combining these with an industrial putting-out system by then obsolete in the West but remarkably suited to her social and economic order in transition, Japan rapidly increased her stock of capital and her military power. She emerged victorious from three wars and expanded her empire with the addition of Formosa, Korea, and Manchuria.

During this time her population went through the growth cycle that European countries have taught us to think of as appropriate. Starting 100 years ago with a decennial increase of 5 percent numbers rose by over 12 percent in each decade of this century. What lies behind these figures is, above all, the

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* Warren S. Thompson, Population and Progress in the Far East, Chicago: University of Chicago Press, 1959, 443 pp., $7.50.

declining death rate. The birth rate also started to fall in the nineteen-thirties; intercensal figures of population growth do not show the fall, but it has become very conspicuous in annual rates since 1950. In the three years from 1950 to 1953 births dropped from 28 to 21 per thousand and continued downward to 18 in 1956. This may be compared to Canada's 28 in the same year, as reversing the usual notion of the relation of birth rates in eastern and western countries. It is Japan's cities, like western cities, which have led the fall. In the early phases the means to decline of births were abortions, of which in 1954, 1,143,000 were legal and many illegal. Abortion, however, does not appear to be a long-run problem, for change to more satisfactory methods of family limitation is now actively sponsored and spreading rapidly.

Japan's relationship to Asia has been basic to her industrial expansion. She acquired from her neighbors and colonies food, fertilizer, minerals, and fibers, and on the other hand her manufacturing industries became peculiarly suited to the production of low-priced rubber shoes, bicycles, crockery, and cotton and rayon goods which Asians could afford. Where colonies were taken over, their output of food was greatly stepped up under Japanese direction.

At the end of World War II Japan was stripped of her colonies and had to live within her 142,000 square miles of a hundred years ago, but now with three times the population. She has concentrated on increasing the efficiency of her industries and on reducing the rate of population growth, but despite major achievements in both respects she still increases by 900,000 persons each year and faces substantial difficulties in providing jobs and food for the increment. Some of her basic lines of manufacture, such as cotton, have been developed in India and China, thus reducing the Japanese market. Increase of trade with mainland China has been suggested, but it involves major political risks. Thompson concludes that although few Japanese would now support a movement of territorial expansion, many may do so in the next few years, as the felt pressure of population increases.

II

India is in an earlier stage of the demographic transition. The 236 million counted in the census of 1891 for the area that is now India has grown to over 400 million. Seventy years ago the population increase was about 1 percent per decade; now it is 14 percent.

Official Indian census forecasts of future population which averaged a population increase of 1.3 percent per year were considered too low by Coale and Hoover; Thompson in turn regards Coale and Hoover's medium projection as too low. In general educated Indians take their population problem very seriously, and the government has made a widespread effort to introduce family planning into the villages. Thompson does not believe that the rational attitudes of educated Indians will spread to the villages quickly; he thinks that about 25 years will be required to reduce the rate of population growth substantially below the present level, and that in the meantime it may well be much higher.

The changing population of India has had drastic effects on its economy over the past 40 years. Prior to 1921 India exported food grains; since 1921 imports of food grains have exceeded exports by a steadily increasing amount.

There has been little increase either in the amount of land under cultivation or the productivity per unit of cultivation. The consequence is declining per capita food consumption; FAO gives 1,970 calories per person in 1934-38, and 1,690 calories in 1947-48 in India and Pakistan. The per capita intake of India (excluding Pakistan) in 1950-51 was even lower--1,640 calories. The amount of investment allocated to agriculture and community development in the Second Five Year Plan was 12 percent of total investment--less than in the First Plan. Large-scale starvation has been unknown in recent times, except in such extraordinary circumstances as those prevailing in Bengal in 1943 when a million and a half persons starved to death. Undoubtedly the world is united in a degree which makes unlikely the recurrence of famines in peace time.

One manifestation of population growth is a bitter unemployment problem. Widespread advances in education are being made in India as elsewhere, partly as preparation for employment in industry. However, neither Professor Thompson nor the Indian authorities have much hope of industry employing large numbers of persons, even though industrial investment is to be heavy. He also regards as too optimistic the assumption that the ratio of investment to increase in production will be about 2.2 to 1--in other words, he is uncertain of the degree to which the investment will produce income, just as he is unsure of its employment potential. The prospect for rising levels of living seems to Thompson to be less bright than it is considered by Indian leaders. Mounting population pressure in India, unlike that in Japan, will hardly make for aggressive action against other countries, but it may open the way to authoritarian government.

III

Thompson gives an extensive account of the figures on Chinese population. Previous sources which he quotes number about a dozen in the preceding 25 years, and none of them contains any hint of the high total of the 1953 census which, with its published result of over 600 million Chinese citizens, seems to have surprised even the leaders of the regime. Thompson is inclined to accept this, as well as an annual increase of 2 percent, or 12 million persons; if such a rate does not now exist it will be reached very soon. He cites the birth rates for sixteen rural communities averaging 42 per thousand between 1951 and 1954, and for the same areas an average death rate of 21 per thousand.

Figures are quoted extensively from Chinese sources giving areas under crop and yields. Thompson dismisses the official claims as extravagant; his conclusion is that "there is little firm ground for believing there was substantial progress in crop yields up to and including 1956 as compared with pre-war years." Whether agricultural production is increasing at 5 percent per year or more or less, is hard to say in the face of mutually contradicting statements from Peking.

The first step of the regime was to divide up land among the peasants and then introduce cooperatives in the hope of overcoming the disadvantages of small-scale holdings. This continued until 1958, when a move was made in what seems an opposite direction: the establishment of communes containing perhaps 30,000 people each and intended to be more or less self-sufficient in both agricultural and industrial production, a self-sufficiency apparently aimed

at restraining migration to cities. At least initially the sexes were segregated. To what degree the communes can solve the problem of population remains to be seen. It also remains to be seen to what extent the considerable exploration for minerals, the building of primary steel plants and other industry, and the intensity of education in technical fields will generate rapid development.

IV

Briefer treatment is given to other countries of South Asia, including the Philippines, Indonesia, and Indo-China. Everywhere the conclusion is the same: that population is growing and will grow faster before it starts to slow down; any local food surpluses will disappear; and present food deficits will increase. The phenomenal increase in the population of Java from less than 5 million in 1820 to 55 million at the present time is described. Little hope is offered by migration to the outer islands, which once seemed a possibility, or by the development of industry.

The main conclusion of the book is that felt population pressure is likely to increase in most parts of Asia in the near future, and that it is a possible cause of war. This doctrine of the cause of war goes back at least as far as the Bible and Plato. More immediately, if population growth continues at its present rate, no likely increase in production will raise levels of living. The issue seems of such importance to Thompson that he considers measures for curtailing population growth more urgent than some of the investment in production:

> If even one-fourth or one-third of the money and effort being used to establish heavy industry and basic services were devoted to educating the masses in the need for birth control, the rate of population growth could almost certainly be reduced in a shorter time than now appears probable, and the level of living could be raised much faster during the next two or three decades than will be possible by following their present plans for depending almost entirely on economic development to achieve this aim. This does not seem to be realized in either India or China.

Professor Thompson, despite his wide sympathies, writes always as a westerner interested in a practical but narrow set of goals; he is not at all concerned about the destructive possibilities of the methods for attaining those goals. "Much of the cost [of education] will be wasted if education is not used to hasten the erosion of the traditional patterns of conduct obstructing the application of knowledge to practical problems." I for one do not know what elements in traditional patterns of conduct help develop and what elements hinder it. The erosion of traditional patterns, furthermore, does not necessarily produce new and desirable patterns, and to assume that it does is to set up an absurdly simple doctrine of culture change. Thompson is restricted also in disregarding the vast literature which now exists on economic development, in which the flame of controversy rages over balanced growth, means of saving, taxation of peasants, local industry versus centralized industry, the problem of administration in a poverty-stricken democratic state. None of these issues is given much attention in the present volume, which suffers thereby a kind of isolation despite the author's extensive travel and data collection.

THE AGRARIAN ORIGINS OF MODERN JAPAN*

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Economic research on less-developed countries has been advancing rapidly, with more and more attention being paid to the causes and processes of the modern development of Japan since the Meiji Restoration of 1868. While traveling around the United States, I have been questioned several times as to how Japan achieved her rapid modernization since the latter half of the nineteenth century. The answer to that question presents a big and difficult problem which must be approached from several viewpoints. In order to answer the question, we should divide the problem into two: (1) the causes of the development, and (2) the analysis of the process.

Many Japanese economic historians, particularly since the end of the war, have been doing research on the bases and causes of the economic development of the Meiji period. Most of them are concentrating their efforts on the agricultural situations of the Tokugawa period which preceded the Meiji period by about three hundred years. Essentially they are trying to find the causes for the transformation of rural villages and agricultural production. They usually attempt to secure unpublished documents which are to be found in old families in rural villages. As may be easily understood, it is difficult to find these documents and because of the limited number of documents, it is more difficult to reach any conclusion concerning overall Japanese development. Many of the articles and books which have been written based on these documents have tried to point out some causes of the development. However, I dare say that there are few books which deal with the causes of development from the viewpoint of agriculture systematically and directly in the economic historical field in Japan.

Professor Thomas C. Smith of Stanford University, in his first book, Political Change and Industrial Development in Japan: Government Enterprise, 1868-1880,[1] treated some phases of the economic development in the early part of the Meiji period. In his new book, Agrarian Origins of Modern Japan, he discusses the causes of the development straightforwardly and ambitiously.

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* Thomas C. Smith, The Agrarian Origins of Modern Japan, Stanford, Stanford University Press, 1559, pp. xii, 250, $5.00.

1. Stanford, Stanford University Press, 1955.

In the beginning of this book, the author opposes the prevailing opinion that no remarkable changes took place in Japanese agriculture during the Tokugawa period. He emphasizes that the resistance to change in agriculture during this period has been too much exaggerated. He feels that the changes should be compared to the agricultural revolution in Europe.

The author divides his book into two parts. He describes the fundamental characteristics of the traditional village during the Tokugawa period in Part One. In Part Two he analyzes the changes that took place in this period with particular emphasis on the latter years.

Firstly, the author points out that at the beginning of the Tokugawa period during the middle of the seventeenth century, every rural village consisted of one or two very large holdings and many small holdings. The labor necessary to the cultivation of the large holding was supplied by expanding the labor force beyond the usual family of kin through the addition of the fudai or hereditary servant and the nago. The fudai were held on long term, sometimes taken into the family as children, and the nago were settled on the land and given dwellings in return for their labor. But gradually the nago moved into the holder class and the fudai entered into the nago class, receiving land and establishing branch families. For the most part new holdings were created by dividing the existing ones among elements of the same family. These changes were beneficial for the main families. The result was a few large families and many small ones in the village. There were clusters which consisted of ten or twenty small units with one large unit as the nucleus. There were lines of obligations running between the large unit and the small ones. Thus the village constituted clusters of mutually dependent farming units. All these groupings were very similar in organization and duplicated in miniature the hierarchical economic and social structure of the village. As cooperative units, the groups performed a number of indispensable functions for their members. The heads of lineage groups held politically powerful positions in the village, since the lord did his utmost to support and exalt their positions in the village.

Secondly, the author analyzes the change of this structure. The growth of the market should be pointed out. After the Tokugawa conquest, people became accustomed to peace, transport improved, the warrior class was removed from the countryside to castle towns and consequently the urban population increased rapidly. This growth of an urban population gave incentive to the farmers to supply more grain from remote places. Most crops except grain gradually came from regions where growing conditions were especially favorable, e.g. mulberries, cotton, sugar cane. Also cottage industries, such as silk, cotton and hemp weaving developed. As commercial farming spread, so did the use of money. Money expenditure increased gradually, the largest item being for commercial fertilizer.

Next, the technical changes should be mentioned. Most changes resulted from the spread of known techniques from the localities in which they had been developed to areas where they were previously unknown or unused. All of the innovations in farming increased the productivity of land, but commercial fertilizers were the most important in raising yields. A second technical development of importance was the increase in the number of plant varieties. Another was the extension of irrigation. As the result of these improvements, the yield on land increased greatly, technical innovations also increased per-acre

requirements of labor and produced a trend toward smaller farming units. These tendencies were just the opposite of the agricultural revolutions in some Western countries.

The transformation of labor was based on these changes. One development was the rise in the cost of labor and the other was the transformation of the typical farm worker from the fudai to the hokonin, to the wage laborer. The hokonin were persons hired for a fixed period and payment. These developments struck powerfully and destructively at the bases of traditional farming on the large holdings. They, together with technical changes in farming and the growth of industrial employment in the villages, forced a shift from the tezukuri to tenant farming on large holdings. The tezukuri were large holdings worked as farming units by the holders and various dependents.

The need to cut labor costs was the main reason for adopting tenant farming, while a secondary one was the desire to shift to tenants the burden of other rising costs. These problems along with a shift to a more intensive type of farming favored small units over large. The unique character of family labor and the availability of outside employment enabled the small land holders to cope better with these problems. This slow revolution affected the nago, who were increasingly freed from labor service and to whom land was gradually transferred. After the nago had become economically and socially autonomous, it was legally impossible to treat them as nago any more. The decline of cooperative groups was due to the formation of new economic ties between members of the same groups and a general decline in cooperation. The latter was due to the transformation of farm management and the labor curve.

As the cooperative groups languished, individual interests emerged. A conspicuous indication of this change was the steady concentration of land ownership. The most important developments were the creation of a class of landless families and the widening of the distance between the rural rich and the mass of peasants.

Political conflicts broke out during the last century of the Tokugawa period. One of the main issues was a disenfranchised party that demanded equal rights. Indeed the rich and the poor tended to be on opposite sides of these struggles.

Lastly, as the conclusion of the study, the author tries to figure out the agricultural origins of modern Japan. "If a backward country, such as Japan was in 1850, is to modernize as rapidly as Japan did, it seems necessary that it satisfies a minimum of four conditions. First it must have a leadership with a vision of a future. Second, the leadership must have control over a government with a high degree of authority and stability for decades. Third, the economy must afford the means of investing on a significant scale. Last, industry must have a satisfactory supply of labor." He discusses briefly these four conditions.

Firstly, the Tokugawa gave the village an extraordinary autonomy which worked very well, but everything of this political system depended on the continuing loyalty of the peasants to the lords and the shogunate. However, the agrarian issues, such as the spread of tenancy, the movement of population from village to town, official trade monopolies and so on, contributed to the

growing political crisis. The stable structure of power in the village was upset. Peasants took part in the Restoration. The new government could not use victory merely to redistribute power within the warrior class. This means that the new leaders who were mainly from the warrior class were to have a wide vision of the future.

In order to have continuing support from the nation, the new leaders utilized the traditional loyalty and obligation among the farmers, that is, they redirected the loyalty of the farmers from the lords and the shogunate to the Emperor. They pushed at any cost with supreme nerve or blind faith. It was realized by the characteristics of the agrarian change. Small size of farming, family organization of production, unsparing use of land, village system of small peasants, rice culture--all of these remained and meant the continuance of communal effort, self-sufficiency and conservative institutions. Thus the state was able to sustain tradition even in the face of extraordinary change of economy, society and politics.

According to the tremendous increasing productivity in agriculture during the Tokugawa period, the take from the agriculture by the warrior class at the end of this period was immense. The Meiji government merely redirected it into new channels. For example the land tax accounted for 78% of ordinary revenues for 1868 to 1881.

For upward of one hundred years, the agricultural labor force had been unwittingly prepared for the transition to factory employment and the village could easily supply labor for industry. Also it should be mentioned that the villages had been exporting much of their best human materials.

This is a summary of the book. In order to develop his arguments the author uses many books and articles written recently in Japanese. In utilizing these Japanese papers, he not only looked over the recent flood of books and articles which have been appearing in the field of economic history in Japan, as I have mentioned before, but he also has selected excellent ones and based his arguments on these. He bases his work on original documents; for example, his study of the political conflict in some villages in Kishu Province regarding the Miyaza. The writings of the Tokugawa period are somewhat different from the present and it requires special discipline to read them.

I admire his work very much, particularly in two points. Firstly, he develops his argument on his wide reading in excellent Japanese literature. Secondly, he discusses these basic tendencies and problems quite well. I have never read, in English or Japanese, such a lucid analysis of the agricultural history of the Tokugawa period. I agree generally with his conclusion on a minimum of four conditions for the modernization of Japan. They are very suggestive to the Japanese.

However, I have some reservations about his argument. Firstly, he describes the development so clearly that he hardly pays attention to the great regional and historical diversity of agriculture in the Tokugawa period. Were the changes and developments as clear and simple as the author emphasizes here? He does quote many materials, but he often develops his arguments on a very limited sample. To take one illustration, he explains the tendency to the enlargement of large farms and the shrinkage of small farms on the basis of

only one village in Shinsyu Province. If he wishes to support his conclusion, I believe he should base his argument on data gathered from different regions, or otherwise he should prove this small village was typical of all of Japan at that time.

Secondly, one of the important facts in the Tokugawa period was that the population was nearly stationary. Economic development is usually accompanied by some increase in population. The author explains in this book that the movement of rural population to towns was large and that agricultural production increased tremendously. Then the apparent contradiction between these migrations and rising production and the stationary population should be emphasized or analyzed more fully.

I would like to mention some minor mistakes in the Japanese language. For instance, the spelling of the names of Prof. Tobata (pp. 94, 95n, 97n, 221) and Prof. Mitsuhashi (p. 222). But these may be the responsibility of the Japanese who helped the author.

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PART 2

ECONOMIC DEVELOPMENT
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QUANTITATIVE ASPECTS OF THE ECONOMIC GROWTH OF NATIONS

V. Capital Formation Proportions: International Comparisons for Recent Years

SIMON KUZNETS

RESEARCH CENTER IN ECONOMIC DEVELOPMENT AND CULTURAL CHANGE
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QUANTITATIVE ASPECTS OF THE ECONOMIC GROWTH OF NATIONS:

V. CAPITAL FORMATION PROPORTIONS: INTERNATIONAL COMPARISONS FOR RECENT YEARS*

Simon Kuznets, The Johns Hopkins University

I. Introduction

In this paper, the fifth in the series,[1] we assemble comparative data on capital formation and its components, in relation to national product. A brief discussion of definitions and their limitations is followed by international comparisons for the recent post-World War II years. Because of the quantity of data to be covered and the length of the present paper, the long-term records, available for a much smaller number of countries, will be analyzed in the next paper in the series.

Reproducible capital of a country, as commonly measured, includes: (i) all construction and improvement attached to land (buildings, residential and non-residential, dams, roads, land improvement, inputs into exploration and improvement of natural resources, etc.--excluding military installations, at least in the United Nations accounts); (ii) machinery and equipment within the country in the hands of producers, private and government (but neither the durable goods in the hands of households nor, in prevalent practice, war equipment); (iii) inventories within the country in the hands of business enterprises and governments (the latter also usually excluding war materiel); (iv) net balance of claims against foreign countries--the only non-tangible capital good. The sum of (i) and (ii) is domestic fixed capital; the sum of (i), (ii), and (iii) is total domestic capital; the sum of (i), (ii), (iii), and (iv) is total national capital.

* This paper draws heavily upon work in the field initiated under the auspices of the Committee on Economic Growth of the Social Science Research Council. As with the other papers in the series, Miss Lillian Epstein provided indispensable assistance in preparing the tables and editing the text.

1. The others, under the general title, Quantitative Aspects of the Economic Growth of Nations, are: "I. Levels and Variability of Rates of Growth," Economic Development and Cultural Change, Vol. V, No. 1, October 1956; "II. Industrial Distribution of National Product and Labor Force," ibid., Supplement to Vol. V, No. 4, July 1957; "III. Industrial Distribution of Income and Labor Force by States, United States, 1919-21 to 1955," ibid., Vol. VI, No. 4, Part II, July 1958; "IV. Distribution of National Income by Factor Shares," ibid., Vol. VII, No. 3, Part II, April 1959.

Capital formation designates additions to the stock of capital as defined (material and reproducible)--gross if current consumption of fixed capital is not deducted, net if it is. Additions to inventories and to claims against foreign countries are always net. We can thus have gross or net domestic fixed capital formation--a sum of gross or net additions to (i) and (ii); gross or net domestic capital formation--a sum of gross or net additions to (i) and (ii) and net additions to (iii); and gross or net national capital formation, a sum of gross or net additions to (i) and (ii) and net additions to (iii) and (iv).

Capital formation is measured by the flow of resources into it. Gross and net domestic capital formation (fixed or total) are properly parts of gross and net domestic product--which differ from national product by the flow of factor payments across the nation's boundaries. Gross and net capital formation (national) are components of gross and net national product; and on a countrywide scale equal national savings, the part of national product retained for use in further production. The remaining components of national product are flow of goods to ultimate consumers (individuals, households, and private non-profit institutions) and, in the most generally used definition, consumption by government (i.e., purchases by the latter of commodities and services); and their total forms the part of current product that is consumed. It is clearly of interest to consider capital formation in relation to national product rather than as absolute amounts.

The capital formation proportion (the term here refers to the ratio of capital formation to the appropriate national product total) has two analytical aspects. The first stems from the role of capital as a productive factor. Since capital is a tool for further production, the larger the capital formation proportion, other conditions being equal, the higher the rate of growth of national product that can be generated. The second aspect stems from the fact that the national capital formation proportion represents the fraction of national product that is saved; and differences and variations in that fraction may shed light on the relation between income, its level, or its rate of growth, and the savings proportion. The capital formation proportion is thus a means for studying not only the production but also the use of income.

It must be admitted from the outset that for either purpose the capital formation proportion is far from adequate. Capital--particularly in the concept used here, which is limited to material and reproducible goods--is not the only productive factor. It excludes the capital investment in training the labor force, as well as irreproducible natural resources. Different endowments of natural resources, in combination with different supplies of labor of different skill and training, may--even if we disregard major changes in production technology and over-all social structure--mean different rates of growth of national product, despite the same capital formation proportion. A thorough analysis of the production of income should include these other factors of production; and if available data and the promise of the analytical yield justify the effort, this more inclusive analysis should be attempted. Unfortunately, it is impracticable to extend the view here beyond the capital formation proportion proper.

Nor does the capital formation proportion give us much insight into the factors and mechanisms that determine the connection between levels and rates of growth of income and the savings fraction. While the tables below do provide some indication of the shares of the major groups of savers (households,

business enterprises, governments) in total national savings, a full analysis of the savings-income relations would require a review not only of the other major uses of income (flow of goods to households and non-profit institutions, and government consumption), but also of budget cross-section data.

We therefore begin the study of the data in the present paper, fully aware that they are only a part of the complete story. The justification for doing so is that the volume of data on this one part is fairly large, and the attempt to organize it in some orderly fashion seems worthwhile. It may permit us to observe systematic patterns in the relation between the capital formation proportion and growth of income or between it and levels of income. Such findings of reasonably orderly patterns in this one segment would then permit us to formulate some ad hoc hypotheses which would, on the one hand, associate these findings with other available information in the corpus of economic knowledge; and on the other, provide us with guides in the broader studies of the factors of production that determine the product, and of income and other factors that determine the savings fraction.

II. The Over-All Capital Formation Proportions

Table 1 summarizes the evidence on the proportions of gross fixed domestic, total domestic, and total national capital formation, to the relevant national product totals. For each country, the proportions were based on the cumulated totals, usually for the seven most recently reported years (1951-57), although for some countries fewer years had to be used. The cumulated totals of capital formation were divided by the cumulated totals of the appropriate countrywide product--gross domestic product for domestic capital formation and gross national product for gross national capital formation. In one or two countries gross national product had to be substituted for gross domestic product, but the error involved is slight since the two differ by only a minor fraction. All underlying figures were in current prices. We then calculated unweighted arithmetic means of the capital formation proportions derived for each country, for the groups distinguished in Table 1. The countries are grouped by their per capita incomes in recent years (1952-54) along the lines followed in Papers II and IV of this series. [2]

Table 1 excludes all Communist countries, and countries with population of less than a million--which reduces variability in the capital formation proportions. Nevertheless, and despite the length of the period, these proportions are quite diverse and the dispersion within each group is marked. The full detail on the spread appears in Appendix Table 1, which gives the ratios for each of the fifty odd countries covered in the text table. That table reveals that some politically dependent territories, e.g., the Belgian Congo and the Federation of Rhodesia and Nyasaland, are characterized by high capital formation proportions--although their per capita incomes are quite low. Also, in several politically independent countries, financing by foreign funds is a large

2. The Roman numeral groups range from I for the highest per capita income to VII for the lowest, the spread being approximately from 17 to 1. For more details concerning this grouping see Paper II, p. 7.

Table 1.
Proportions of Gross Capital Formation to Gross Domestic or National Product, Countries Grouped by Per Capita Product, Post-World War II Years (Based on current price totals)

Proportions	Groups of Countries by Per Capita Product							Wider Groups			
	I (1)	II (2)	III (3)	IV (4)	V (5)	VI (6)	VII (7)	I (8)	II & III (9)	IV & V (10)	VI & VII (11)
A. All Countries											
Gross Fixed Capital Formation to Gross Domestic Product											
1. Number of countries	7	7	6	11	4	8	5	7	13	15	13
2. Proportion (%)	19.6	22.1	17.9	15.0	16.5	12.8	16.3	19.6	20.2	15.4	14.2
Increase in Stocks to Gross Domestic Product											
3. Number of countries	7	6	6	10	4	8	5	7	12	14	13
4. Proportion (%)	1.5	1.4	0.4	1.4	2.6	1.7	1.3	1.5	0.9	1.8	1.6
Gross Domestic Capital Formation to Gross Domestic Product											
5. Number of countries	8	7	6	11	6	10	8	8	13	17	18
6. Proportion (%)	21.4	23.4	18.5	16.3	17.6	16.7	14.0	21.4	21.1	16.8	15.5
Change in Foreign Claims to Gross Domestic Capital Formation											
7. Number of countries	8	7	6	11	6	10	8	8	13	17	18
8. Proportion (%)	-0.5	+0.3	-40.5	-7.9	-10.0	-12.0	-26.5	-0.5	-18.5	-8.7	-18.4
Gross Capital Formation to Gross National Product											
9. Number of countries	8	7	6	11	6	10	8	8	13	17	18
10. Proportion (%)	21.0	23.8	10.3	14.5	16.6	14.5	11.4	21.0	17.6	15.2	13.1

B. Politically Dependent Territories											
11. Number of territories	0	0	1	1	1	2	3				
12. Proportion, gross domestic capital formation to gross domestic product (%)	-	-	19.8	8.2	16.8	23.8	19.4				
13. Proportion, change in foreign claims to gross domestic capital formation (%)	-	-	-88.3	81.0	-48.5	-5.4	-10.9				
14. Proportion, gross capital formation to gross national product (%)	-	-	2.2	15.9	8.7	20.6	17.6				
C. Financially Dependent Countries											
15. Number of countries	0	0	2	2	0	1	2				
16. Proportion, gross domestic capital formation to gross domestic product (%)	-	-	19.8	15.1	-	17.1	7.9				
17. Proportion, change in foreign claims to gross domestic capital formation (%)	-	-	-63.0	-40.0	-	-34.5	-84.2				
18. Proportion, gross capital formation to gross national product (%)	-	-	6.0	8.7	-	11.2	0.3				
D. All Other Countries											
19. Number of countries	8	7	3	8	5	7	3	8	10	13	10
20. Proportion, gross domestic capital formation to gross domestic product (%)	21.4	23.4	17.2	17.6	17.8	14.6	12.7	21.4	21.5	17.6	14.0

(Continued on next page)

Table 1 (Cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
D. All Other Countries (Cont.)											
21. Proportion, change in foreign claims to gross domestic capital formation (%)	-0.5	+0.3	-9.5	-11.0	-2.3	-10.6	-3.6	-0.5	-2.6	-7.7	-8.5
22. Proportion, gross capital formation to gross national product (%)	21.0	23.8	15.8	15.7	18.2	13.2	12.7	21.0	21.4	16.7	13.0

Proportions are unweighted arithmetic means of percentages for individual countries given in Appendix Table 1.

Panel B covers areas that were, during all or most of the period, political dependencies or parts of larger political units: Puerto Rico in Group III, Malaya in Group IV, Jamaica in Group V, Ghana and the Federation of Rhodesia and Nyasaland in Group VI, Belgian Congo, Morocco, and Nigeria in Group VII.

Panel C covers politically independent countries that were, during the period, heavily dependent upon financing from abroad, as indicated by a ratio of net capital imports to gross domestic capital formation exceeding a third: Ireland and Israel in Group III, Greece and Panama in Group IV, Taiwan in Group VI, Indonesia and South Korea in Group VII.

fraction of domestic capital formation--a condition of financial dependence, constituting an exceptional situation that could scarcely be called long-term. It, therefore, seemed desirable to segregate the politically and financially dependent areas in Panels B and C, and to provide a set of averages in Panel D for a smaller but perhaps more representative sample of non-Communist countries.

The findings, which are based on Table 1 but also refer to some of the detail in Appendix Table 1, may now be stated.

(a) The proportion of gross domestic capital formation to gross domestic product, as shown by the group averages, varies from 14 to 23-1/2 percent (line 6). Furthermore, it is, in general, positively associated with per capita income, being higher in the high income countries than in the low. But the association is not too close, and we shall have occasion to discuss the possible reasons for the rather limited range in the capital formation proportion in association with the wide range in per capita income.

(b) The dominant component of gross domestic capital formation is fixed capital formation: net additions to inventories account on the average for only 1 to 3 percent of gross national product (lines 2 and 4). But whereas the relative weight of fixed capital formation in national product declines as we move from the high to the low income countries, than of inventory accumulation does not; and, in consequence, its share in gross domestic (or national) capital formation is appreciably greater in the low income than in the high income countries. We shall consider this finding more closely when we deal with the composition of capital formation.

(c) Changes in foreign claims are a minor fraction of gross capital formation in the high income, industrialized countries--at least as far as the group averages show. (The latter may conceal a combination of large positive and negative fractions for individual countries.) However, they are a sizeable negative fraction of gross domestic capital formation for countries in Groups III-VII--meaning that in these countries a significant share of domestic capital is financed through foreign funds (line 8). But when the few countries in which foreign financing is extensive are excluded, the average shares of foreign financing in gross domestic capital formation are much smaller (line 21).

(d) The range in the gross national capital formation proportion among groups of countries classified by per capita income is wider than that in the gross domestic capital formation proportion. In Panel A, the range for the wider groups is from 15-1/2 to 21-1/2 percent for the domestic capital formation proportion, from 13 to 21 percent for the national capital formation proportion (lines 6 and 10). For the wider groups in the more representative sample in Panel D, the range is from 14 to 21-1/2 percent for the domestic capital formation proportion and from 13 to 21-1/2 percent for the national capital formation proportion, the latter again exceeding the former (lines 20 and 22).

The wide dispersion of gross capital formation proportions within groups of countries classified by per capita income and the relatively narrow range of the averages for the groups raise the question whether per capita income is the variable with which capital formation proportions should be associated. It may well be that another index of the economic growth of countries would yield a

closer association with capital formation proportions and a wider range in the latter among groups of countries classified by that index. One such alternative measure of economic growth that is easily available is the share of national product accounted for by an extended M sector--the total for mining, manufacturing, and construction plus transportation and communication (designated M+). It may be argued that if the share of the M+ sector is large, other conditions being equal, capital formation proportions would be large because the industries in this sector produce fixed capital goods; and their great weight within a country's economy would mean a high ratio of at least fixed gross capital formation to gross product. Second, the capital needed for this sector, relative to its output, may be larger than for such sectors as agriculture and services (i.e., the sectoral capital-output ratio may be higher); and this greater relative need for capital would also make for high capital formation proportions in those countries in which the share of the M+ sector in national product is high. High domestic capital formation proportions would probably mean high national capital formation proportions--although differences in the relative importance of foreign financing might qualify the association.

For Table 2 we, therefore, arrayed countries by the share of the M+ sector in national product, utilizing for this purpose, whenever possible, the data for the post-World War II years covered in Table 1; and divided them into seven capital letter groups by descending shares of the M+ sector. First, all countries were used, regardless of political and financial dependence; and the averages in columns 2-4 are, as usual, unweighted arithmetic means (lines 1-11). For column 5 we averaged the Roman numeral ranks of the countries included in the capital letter groups--e.g., an equal number of I's and II's would yield a mean of I.5. Then the calculations were repeated for countries excluding politically and financially dependent units (lines 12-22).

For all countries, the average share of the M+ sector drops from 57 percent in Group A to 17 percent in Group G; or using wider groups, from 57 percent in Group A to 20 percent in Groups F and G (column 2). Because of the marked association between industrial structure and per capita income, the average rank by per capita income also declines significantly as we move down the array by the share of the M+ sector in domestic product (column 5). But the decline in the Roman numeral rank of per capita income is from I.7 in line 1 to VI.0 in line 7--not from I to VII, as in Table 1. The domestic capital formation proportion also drops significantly and consistently, except for the slight rise from Group A to Group B (column 3). Most interesting is the fact that the range in the gross domestic capital formation proportion in Table 2, lines 1-7--from 13 to 24 percent--is wider than that in the seven groups in Table 1, line 6--from 14 to 23-1/2 percent; and if we disregard the change from Group A to Group B (which is similar to that from Group I to Group II in Table 1), in the one case of a rise in the rank of per capita income in column 5 (from Group C to Group D), there is a decline in the domestic capital formation proportion associated with a decline in the share of the M+ sector. Even for the wider groups in lines 8-11, the range in the domestic capital formation proportion--from 13 to 23 percent--is wider than that in the wider groups of countries by per capita income in Table 1, line 6--from 15-1/2 to 21-1/2 percent. Thus, for the domestic capital formation proportion the share of the M+ sector is as important a variable as income per capita.

Table 2.
Proportions of Gross Capital Formation to Gross Domestic or National Product, Countries Grouped by the Share of the M+ Sector in Gross Domestic Product, Post-World War II Years (Based on current price totals)

Groups of Countries by Share of M+ Sector in Gross Domestic Product	No. of Countries	Share of M+ Sector in Gross Domestic Product (%)	Proportion, Gross Domestic Capital Formation to Gross Domestic Product (%)	Proportion, Gross Capital Formation to Gross National Product (%)	Relative Position in Grouping by Per Capita Product
A. All Countries	(1)	(2)	(3)	(4)	(5)
1. A	6	57.4	21.4	21.8	I. 7
2. B	6	48.8	23.9	23.4	II. 8
3. C	7	44.6	22.5	19.7	IV. 3
4. D	7	35.4	19.9	12.1	III. 9
5. E	7	29.9	15.9	13.1	IV. 4
6. F	7	23.2	13.5	12.1	V. 1
7. G	7	16.8	13.0	9.3	VI. 0
Wider Groups					
8. A	6	57.4	21.4	21.8	I. 7
9. B & C	13	46.5	23.1	21.4	III. 6
10. D & E	14	32.6	17.9	12.6	IV. 1
11. F & G	14	20.0	13.3	10.7	V. 6
B. Countries Excluding Politically and Financially Dependent Units					
12. A	5	57.9	21.4	21.8	I. 8
13. B	5	50.5	23.5	23.1	II. 0
14. C	5	46.5	18.9	17.9	III. 0
15. D	4	39.9	19.9	18.1	IV. 0
16. E	5	31.4	17.8	16.3	IV. 0
17. F	5	24.4	13.2	12.5	V. 2
18. G	5	19.3	15.6	14.7	V. 6
Wider Groups					
19. A	5	57.9	21.4	21.8	I. 8
20. B & C	10	48.5	21.2	20.5	II. 5
21. D & E	9	35.2	18.7	17.1	IV. 0
22. F & G	10	21.8	14.4	13.6	V. 4

Entries in columns 2-4 are unweighted arithmetic means of percentage for individual countries given in Appendix Table 1. The derivation of column 5 is described in the text.

For countries excluded from Panel B see notes to Table 1.

To a somewhat lesser extent the same can be said of the association between the share of the M+ sector and the gross national capital formation proportion--for all countries. The range in Table 2, column 4, from 23-1/2 to 9 percent is somewhat wider than that in Table 1, line 10--from 24 to 10 percent; in the wider groups the ranges are from 11 to 22 and from 13 to 21 percent, respectively.

The picture changes when we exclude the countries that, by the criteria used throughout this paper, were either politically or financially dependent (lines 12-22). The downward movement of both domestic and national capital formation proportions is less consistent with the large decline in the share of the M+ sector. The range among the seven groups in the gross domestic capital formation proportion--from more than 13 to 23-1/2 percent--is somewhat narrower than the range in Table 1, line 20--from less than 13 to 23-1/2 percent; and the same is true of the wider groups, for which the range in Table 2 is from more than 14 to 21-1/2 percent, in Table 1 from 14 to 21-1/2 percent. For the gross national capital formation proportion, the range in the seven groups of Table 2 is from 12-1/2 to 23 percent, that in Table 1, from 13 to 24 percent; for the wider groups the ranges are from 14 to 22 percent and from 13 to 21-1/2 percent, respectively. Clearly, it is particularly in the politically and financially dependent countries that the capital formation proportion is more closely associated with the share of the M+ sector than with the level of per capita income; although even for the smaller sample of countries, excluding those politically and financially dependent, the share of the M+ sector is an important variable affecting capital formation proportions, particularly domestic.

Some further light is shed on this association when we combine, in rather rough fashion, the grouping of countries by per capita income, with that by the share of the M+ sector (Table 3). Within each Roman numeral group we distinguish two subgroups--the a subgroup with the higher shares of the M+ sector, the b subgroup with the lower shares; and then average for each subgroup the share of the M+ sector, the gross domestic capital formation proportion, and the gross national capital formation proportion (columns 2-4). These averages for subgroups permit us to study the effect of the differences in the share of the M+ sector in domestic product on domestic and national capital formation proportions at a given range of income. As a check upon the association we calculated the per capita income within each Roman numeral group and subgroup (column 5, unweighted means of per capita income, in U.S. dollars, except for Group VII for which the estimates are too unreliable).

In dealing with all countries (lines 1-14) we find that, except for Group I, a decline in the share of the M+ sector from subgroup a to subgroup b is accompanied by a drop in the gross domestic capital formation proportion. Moreover, this decline is observed regardless of the direction of movement in per capita income between the two subgroups. (Because of the wide margin of error in the per capita income estimates, differences among them of less than ten to fifteen percent cannot be ascribed much significance.) Within Group II, the domestic capital formation proportion declines from subgroup a to subgroup b, despite the appreciable rise in per capita income; and in the lower income groups the proportion always declines from subgroup a to subgroup b, even when the per capita income differentials between the two subgroups are not significant. The findings for the sample of countries excluding the politically

Table 3.
Proportions of Gross Capital Formation to Gross Domestic or National Product, Countries Grouped by Per Capita Product and Share of M+ Sector in Gross Domestic Product, Post-World War II Years (Based on current price totals)

	Groups of Countries	No. of Countries	Share of M+ Sector in Gross Domestic Product (%)	Proportion, Gross Domestic Capital Formation to Gross Domestic Product (%)	Proportion, Gross Capital Formation to Gross National Product (%)	Per Capita Product (1952-54 U.S.dollars)
	A. All Countries	(1)	(2)	(3)	(4)	(5)
1.	I(6) High M+ shares	3	57.0	17.7	18.5	840
2.	Low M+ shares	3	45.7	22.2	21.0	1,390
3.	II(6) High M+ shares	3	55.2	25.7	26.6	580
4.	Low M+ shares	3	47.4	20.9	20.9	720
5.	III(6) High M+ shares	3	43.2	22.3	8.8	420
6.	Low M+ shares	3	28.7	14.7	11.7	410
7.	IV(9) High M+ shares	5	37.3	19.2	16.5	260
8.	Low M+ shares	5	23.5	15.2	12.7	230
9.	V(5) High M+ shares	3	39.9	18.8	17.0	180
10.	Low M+ shares	3	30.2	15.3	12.7	170
11.	VI(9) High M+ shares	5	36.3	21.6	17.3	120
12.	Low M+ shares	5	22.0	12.3	11.3	130
13.	VII(6) High M+ shares	3	31.5	22.5	21.7	
14.	Low M+ shares	3	14.6	8.5	3.0	
	B. Countries Excluding Politically and Financially Dependent Units (Groups I and II as in lines 1-4)					
15.	III(3) High M+ shares	2	45.9	15.8	14.6	365
16.	Low M+ shares	2	30.7	14.7	13.3	410
17.	IV(7) High M+ shares	4	38.8	19.9	18.3	265
18.	Low M+ shares	4	24.9	15.6	13.9	225
19.	V(4) High M+ shares	2	42.0	22.5	20.4	195
20.	Low M+ shares	2	28.1	14.6	14.7	160
21.	VI(7) High M+ shares	4	32.3	16.6	15.4	125
22.	Low M+ shares	4	20.8	11.8	10.8	130

Entries in columns 2-4 are unweighted arithmetic means of percentages for individual countries given in Appendix Table 1.

Entries in column 5 are unweighted arithmetic means of per capita incomes, given in United Nations, Per Capita National Product of Fifty-five Countries, 1952-1954, Statistical Papers, Series E, No. 4, with the following additions: for Costa Rica the per capita income of Mexico was assumed; for Bolivia that of Peru. Taiwan is omitted from Group VI.

The numbers in parentheses in the stubs indicate the total number of countries included (except for Group VI, column 5 from which Taiwan was excluded). When the number of countries is odd, the middle item is included in both subgroups.

For countries excluded from Panel B see notes to Table 1.

and financially dependent units are similar although not quite so marked (lines 1-4, and 15-22, columns 2, 3, and 5).

The association between the share of the M+ sector and the gross national capital formation proportion is not as close. In addition to the exception within Group I, there is another within Group III, for all countries (lines 5 and 6); although it is eliminated in the smaller and more representative sample of countries (lines 15 and 16). Thus we find that the share of the M+ sector is a significant variable, affecting also the gross national capital formation proportion.[3]

We can go no farther here in the analysis of the association between the share of the M+ sector in domestic product and the gross capital formation proportions. That the former has significant effects, particularly on the domestic capital formation proportion; and that these effects are particularly marked in the low income countries is clearly suggested by Tables 2 and 3. These effects are to be expected if we assume that a sizeable M+ sector facilitates both production and absorption of a larger domestic capital formation proportion (and hence indirectly also of national); and may provide the base for a larger demand for capital investment. Despite the association found, we did not, in the analysis below, use the grouping of countries by the share of the M+ sector or by the combination of it with per capita income--for two reasons. First, while the share of the M+ sector may affect capital formation proportions as much as per capita income, it cannot be assumed to have as wide an effect on various other aspects of economic structure. If then we need a single criterion of classification for all aspects of economic structure and growth, it must still be per capita income. Second, any combination of criteria of classification would be effective only with an adequately large number of final groupings--attained in Table 3 by doubling the number of classes distinguished. But with a limited sample of countries the averages based on inadequately few units in many of the cells would be erratic. We are, therefore, retaining the grouping of countries by per capita income in the tables that follow.

Before considering the general questions suggested by the findings in Table 1, and amplified somewhat in Tables 2 and 3, we review the data on net capital formation proportions, again for the non-Communist countries (Table 4). The entries in Panel A relate to the same years and have been derived by the procedures described in connection with Table 1, but the necessary data are available for fewer countries.

Capital depreciation, or to use the terminology of the United Nations accounts, provision for the consumption of fixed capital is assumed to cover "the current value of wear and tear and foreseen obsolescence of all fixed capital as

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3. The crude attempt in Table 3 to distinguish the effects of the share of the M+ sector from those of per capita income differentials could perhaps have been handled with more apparent neatness through multiple correlation. But the margins of error in per capita incomes are wide, particularly in the low income, less developed countries; the regressions are clearly non-linear; and there is no reason to assume that the variances will stem from normal distributions of deviations. It seemed better to employ the cruder methods, and not to move too far from the identity of the countries.

Table 4.
Proportions of Net Capital Formation to Net Domestic or National Product, Countries Grouped by Per Capita Product, Post-World War II Years (Based on current price totals)

Ratios or Proportions	Groups of Countries by Per Capita Product							Wider Groups			
	I (1)	II (2)	III (3)	IV (4)	V (5)	VI (6)	VII (7)	I (8)	II & III (9)	IV & V (10)	VI & VII (11)
A. All Countries: Calculation A											
Capital Consumption to Gross Fixed Capital Formation											
1. Number of countries	7	7	4	9	4	6	4	7	11	13	10
2. Ratio (%)	43.9	38.7	35.3	36.7	33.9	47.7	30.7	43.9	37.5	35.9	40.9
Capital Consumption to Gross Domestic Capital Formation											
3. Number of countries	7	6	6	8	5	8	4	7	12	13	12
4. Ratio (%)	41.2	39.4	41.9	35.0	30.3	42.3	28.3	41.2	40.7	33.2	37.6
Net Domestic Capital Formation to Net Domestic Product											
5. Number of countries	7	7	6	9	5	8	5	7	13	14	13
6. Proportion (%)	14.2	16.4	12.3	12.1	13.1	11.2	12.9	14.2	14.5	12.5	11.8
Net Capital Formation to Net National Product											
7. Number of countries	7	7	6	9	5	8	5	7	13	14	13
8. Proportion (%)	13.8	16.7	3.5	9.1	11.4	7.9	12.0	13.8	10.6	9.9	9.5

(Continued on next page)

Table 4 (Cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
B. All Countries: Calculation B											
9. Number of countries in line 10	8	7	6	11	6	10	8	8	13	17	18
10. Proportion, gross domestic capital formation to gross domestic product (%)	21.4	23.4	18.5	16.3	17.6	16.7	14.0	21.4	21.1	16.8	15.5
11. Derived ratio, capital consumption to gross domestic product (%)	8.82	9.22	7.75	5.71	5.33	7.06	3.96	8.82	8.59	5.58	5.83
12. Derived proportion, net domestic capital formation to net domestic product (%)	13.8	15.6	11.7	11.2	13.0	10.4	10.5	13.8	13.7	11.9	10.3
13. Number of countries in lines 14 and 15	8	7	6	11	6	10	8	8	13	17	18
14. Ratio, gross capital formation to gross domestic capital formation	0.995	1.003	0.595	0.921	0.900	0.880	0.735	0.995	0.815	0.913	0.816
15. Proportion, gross capital formation to gross national product (%)	21.0	23.8	10.3	14.5	16.6	14.5	11.4	21.0	17.6	15.2	13.1
16. Derived ratio, capital consumption to gross capital formation (%)	41.4	39.3	70.4	38.0	33.7	48.1	38.5	41.4	49.9	36.4	46.1
17. Derived ratio, capital consumption to gross national product (%)	8.69	9.35	7.25	5.51	5.59	6.97	4.39	8.69	8.78	5.53	6.04

18. Derived proportion, net capital formation to net national product (%)	13.5	15.9	3.3	9.5	11.7	8.1	7.3	13.5	9.7	10.2	7.5
C. Countries Excluding Politically and Financially Dependent Units: Calculation B											
19. Number of countries in line 20	8	7	3	8	5	7	3	8	10	13	10
20. Proportion, gross domestic capital formation to gross domestic product (%)	21.4	23.4	17.2	17.6	17.8	14.6	12.7	21.4	21.5	17.6	14.0
21. Derived ratio, capital consumption to gross domestic product (%)	8.82	9.22	7.21	6.16	5.39	6.18	3.59	8.82	8.75	5.84	5.26
22. Derived proportion, net domestic capital formation to net domestic product (%)	13.8	15.6	10.8	12.2	13.1	9.0	9.4	13.8	14.0	12.5	9.2
23. Number of countries in lines 24 and 25	8	7	3	8	5	7	3	8	10	13	10
24. Ratio, gross capital formation to gross domestic capital formation	0.995	1.003	0.905	0.890	0.977	0.894	0.964	0.995	0.974	0.923	0.915
25. Proportion, gross capital formation to gross national product (%)	21.0	23.8	15.8	15.7	18.2	13.2	12.7	21.0	21.4	16.7	13.0
26. Derived ratio, capital consumption to gross capital formation (%)	41.4	39.3	46.3	39.3	31.0	47.3	29.4	41.4	41.8	36.0	41.1

(Continued on next page)

Table 4 (Cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
27. Derived ratio, capital consumption to gross national product (%)	8.69	9.35	7.32	6.17	5.64	6.24	3.73	8.69	8.95	6.01	5.34
28. Derived proportion, net capital formation to net national product (%)	13.5	15.9	9.2	10.2	13.3	7.4	9.3	13.5	13.7	11.4	8.1

Lines 2, 4, 6, and 8: unweighted arithmetic means of percentages for individual countries given in Appendix Table 2.
Lines 9 and 10: from Table 1, lines 5 and 6.
Line 11: (line 4 x line 10 ÷ 100).
Line 12: (line 10) x (1 - line 4/100) + (1 - line 11/100).
Lines 13-15: from Table 1, lines 7, 8, and 10.
Line 16: (line 4 + line 14).
Line 17: (line 16 x line 15 ÷ 100).
Line 18: (line 15) x (1 - line 16/100) + (1 - line 17/100).
Lines 19-20: from Table 1, lines 19 and 20.
Line 21: (line 20 x line 4 ÷ 100).
Line 22: (line 20) x (1 - line 4/100) + (1 - line 21/100).
Lines 23, 24, and 25: from Table 1, lines 19, 21, and 22.
Line 26: (line 4 + line 24).
Line 27: (line 25 x line 26 ÷ 100).
Line 28: (line 25) x (1 - line 26/100) + (1 - line 27/100).

The derived entries in columns 8-11 were calculated directly from the components in these columns, not by averaging the derived entries in columns 1-7. For example, the entry in line 11, column 9 (8.59) is the product of the entry in line 10, column 9 (21.1) and the entry in line 4, column 9 (40.7), divided by 100.

For countries excluded from Panel C, see notes to Table 1.

well as accidental damage to it." (United Nations, Yearbook of National Accounts Statistics, 1958, New York, 1959, p. xv). The difficulties in making a proper estimate of this elusive process are well-known and need not be discussed here. For a number of countries, notably the United States, the estimates are based on legally permitted depreciation charges, which are calculated at original rather than replacement costs. And, in general, the allowance in question, particularly in the developed and industrialized countries, is largely for technical and demand obsolescence--not for physical wear and tear; so that replacement means additions to rather than mere preservation of productive capacity of capital.

Capital consumption ranges between 31 and 48 percent of current gross fixed capital formation and is, with erratic variations, about the same for high and low income countries (line 2). It is not easy to explain the absence of variation in the fraction. Offhand, one would expect that the secular rate of growth in gross fixed capital formation would be higher in the high income than in the low income countries; and given general similarity in the bases of estimating capital consumption, particularly the assumed economic life spans of durable capital goods, this would yield a lower ratio of capital consumption to gross fixed capital formation in the high income countries. On the other hand, as is noted in Table 6 below, long-lived construction was at least as high a proportion of gross fixed capital formation in the low income as in the high income countries: 61 percent in Groups VI and VII, compared with 59 percent in Group I, 54 percent in Groups II and III, and 57 percent in Groups IV and V. Furthermore, in recent years the growth of gross fixed capital formation may have accelerated more in the less developed countries than in the more developed--which, like the higher share of long-lived construction, would also make for a lower ratio of capital consumption to gross fixed capital formation in the low income countries. But these are conjectures, and an adequate explanation of the findings in Table 4 would require a close examination of the procedures used in estimating capital consumption and of the details underlying them in the individual countries.

Whatever the explanation, if we accept the ratios of capital consumption to gross fixed capital formation and the related ratios to total domestic capital formation, i.e., including inventory accumulation (line 4), we can, for 47 countries derive the average proportions of net domestic capital formation to net domestic product (line 6) and of net capital formation to net national product (line 8). It should be noted that the entries in these lines are unweighted means of the proportions for individual countries.

For the seven groups the movements of the net domestic and national capital formation proportions are erratic: the averages for Groups V and VII are larger than those for Groups III, IV, and VI. The wider groups yield a greater semblance of orderly association: the net domestic capital formation proportion declines from 14 or 14-1/2 percent in Groups I, and II and III, to 12-1/2 percent in Groups IV and V, and about 12 percent in Groups VI and VII; the net national capital formation proportion drops from about 14 percent in Group I to 10 percent in Groups IV and V, and 9-1/2 percent in Groups VI and VII. But the range in these net capital formation proportions is quite narrow and the erratic movement among the seven Roman numeral groups qualifies the association.

One difficulty is that capital consumption data are not available for as many countries as are gross capital formation data--particularly in Group VII with only 4, compared with 8 in Table 1; and if we were to exclude the politically and financially dependent units, the number of countries would be reduced even further. We, therefore, thought it best to accept the estimates in lines 2 and 4 as the best available, based on the most comprehensive coverage; and assume that the ratios of capital consumption to gross domestic capital formation for all countries need not be significantly different from those for countries exclusive of politically and financially dependent units.[4] It thus became possible to apply the average capital consumption ratios to the average gross domestic and national capital formation proportions available for the larger number of countries; and derive an alternative set of net capital formation proportions. In this alternative calculation, designated B, we avoid the errors that could be introduced by the use of the smaller sample in Panel A into the calculation of any fraction other than that of capital consumption to gross domestic capital formation.

The precise steps of calculation B are described in the notes to Table 4, and we need only state here that they involve the linking of the capital consumption ratios of Table 4 to the gross capital formation proportions of Table 1. One point should, however, be noted. The group averages of net capital formation proportions derived from group averages of capital consumption ratios and of gross capital formation proportions--rather than from net capital formation proportions calculated for individual countries--are in fact sets of weighted, rather than unweighted, means. Thus, if we had calculated the ratio of capital consumption to gross domestic product for each country, and then averaged the ratios unweighted, the averages would have been somewhat different from those given in line 11. If only because the weights reflect all countries in a group, the resulting averages may well be less erratic than the unweighted averages.[5]

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4. The comparison is in fact provided in Table 18, line 5. The difference is large only for Groups VI and VII combined (narrower Roman numeral groups cannot be shown because the number of countries is too small). Exclusion of the dependent units would have made it impossible to estimate the ratio of capital consumption to capital formation in Group VII and perhaps in Group VI. We, therefore, retained the assumption; although it could be dropped and alternative calculations for the wider groups carried through. The findings would not be affected much.

5. Let a_1 designate the capital consumption ratio and b_1 the gross domestic capital formation proportion for country 1; a_2 and b_2 for country 2; etc. Then for each country the ratio of capital consumption to gross domestic product is the product ab, and the unweighted mean of the latter for the n countries in calculation A is $(a_1b_1 + a_2b_2 + \ldots a_nb_n)/n$. In calculation B, the average is $[(a_1+a_2+\ldots a_n)/n \times (b_1+b_2+\ldots b_n)/n]$. The latter result would be obtained in calculation A, if a_1b_1 were weighted by $(b_1+b_2+\ldots b_n)/b_1$; a_2b_2 by $(b_1+b_2+\ldots b_n)/b_2$; etc. If b_1 happened to be erratically small (large), a_1b_1 would be raised (depressed) because the fraction used as its weight would be raised (depressed) by the downward (upward) error.

Although the general pattern of the association between per capita income and net capital formation proportions in calculation B is not too different from that in calculation A, it has important advantages. The pattern is more systematic. The exclusion of the politically and financially dependent units from the calculation of the capital formation proportions still leaves an adequate sample. Finally, the range of the net capital formation proportions is wider and less erratic. If then we emphasize the averages for the smaller but more representative sample of countries in Panel C of Table 4, the findings can be simply stated. First, the net domestic capital formation proportion varies from 9 to 16 percent among the countries grouped by per capita income, and there is a significant positive association between it and per capita income (line 22). For the wider groups, the range is from 14 percent for Groups I and II and III, to slightly over 9 percent for Groups VI and VII. Second, the range in the net national capital formation proportion in association with per capita income is even wider (line 28). For the larger groups, it moves from more than 13-1/2 percent in Groups I and II and III, to about 8 percent in Groups VI and VII. In other words, the net capital formation (or savings) proportion in the less developed countries is no more than six-tenths of that in the higher income, more developed countries.

Our review of comparative evidence on the over-all capital formation proportions must include the scattered and uncertain data available for the Communist countries (Table 5). In addition to the general problem of reliability of these data, many of them for countries with relatively brief experience in statistical collection and analysis, there are three bothersome questions. First, for all the countries except the U.S.S.R., for which recalculations have been made by Western economists, capital formation is shown as a proportion of net material product--a nationwide aggregate that excludes services not embodied in commodities, such as government administration, defense, personal services, passenger transportation, and the like. Since the numerator, capital formation, is less affected by such omissions than the denominator, aggregate national product, the ratios shown are exaggerated, compared with the ratios in Tables 1 and 4. Second, since the denominator is net material product, the implication is that the numerator is net capital formation, i.e., after allowance for capital consumption. But we have no information on the derivation of the capital consumption charges; nor is there any evidence of an incentive in the Communist countries for adequate provisions for capital consumption similar to that furnished in the non-Communist countries by the taxation on income of business units, the allowance of capital consumption charges as legitimate deductions for tax purposes, and competition among business units in the free markets. But if we assume that these are net capital formation proportions, they should be reduced by from 10 to 20 percent to allow for a deficient denominator. Their conversion into gross capital formation proportions would involve a rather moderate adjustment since the rate of fixed capital formation in the Communist countries has accelerated markedly and the ratios of depreciation charges to current gross fixed capital formation should be relatively low--perhaps no more than a quarter.

But the major difficulty with these ratios lies in their valuation base, particularly in the comparative pricing of capital formation and the rest of the national product. The Communist countries have the power to change internal price relations; and if they desire to accelerate the rate of capital formation, they can attach higher prices to the factors producing capital goods and lower

Table 5.
Proportions of Capital Accumulation to Net Material Product, Communist Countries, Post-World War II Years (Based on constant price totals except for lines 9-11, which are based on current price totals)

	Country (1)	Period (2)	Proportion (%) (3)
1.	Bulgaria	1952-1957	20.0
2.	China (Mainland)	1952-1956	21.2
3.	Hungary	1951-1954	30.1
4.	Hungary	1955-1957	14.8
5.	Hungary	1951-1957[a]	23.5
6.	Poland	1951-1954	22.9
7.	Poland	1955-1957	21.0
8.	Poland	1951-1957[a]	22.1
9.	Poland	1955-1957[b]	18.8
10.	Yugoslavia, gross	1952-1956[b]	29.7
11.	Yugoslavia, net	1952-1956[b]	21.8
12.	U.S.S.R., gross investment to gross national product	1953	26
13.	U.S.S.R., gross investment to gross national product	1957	25

a. Average of entries in lines 3 and 4 or lines 6 and 7 weighted by number of years.

b. Specific adjustment for net balance of imports and exports.

Lines 1-11: United Nations, Yearbook of National Accounts Statistics, 1958, New York, 1959.
Line 12: Trends in Economic Growth, Joint Committee on the Economic Report Print, 83rd Congress, 2nd Session, Washington, 1955, Table X-3, p. 284.
Line 13: Comparisons of the United States and Soviet Economies, Joint Economic Committee Print, Part II, 86th Congress, 1st Session, Washington, 1959, p. 535, Table 3.

prices to factors producing other, largely consumer, goods. As a result, capital formation will be overvalued and consumption undervalued compared with their valuation in countries where the market is allowed to determine prices. In at least one case, that of Mainland China, Dr. T. C. Liu's calculations show that the ratio of net domestic investment plus government consumption to net domestic expenditures in 1957 was 25 percent when the valuation was in 1933 prices (relatively free market) and as high as 36 percent when the valuation was in 1952 prices (government determined prices under the Communist regime).[6] Conversely, if a Communist regime wishes to eliminate excess purchasing power of consumers, it can attach high turnover taxes to consumer goods, while keeping the prices of capital goods down to permit their easier absorption; and if the components of national product are estimated at final prices, the bias may be in the opposite direction. Finally, the whole problem is complicated by the distortions produced by the lag of price weights behind changes in costs under conditions of marked changes in the scale of production. We are thus dealing with a highly uncertain set of indicators and our conclusions must be taken as suggestive rather than substantive findings. The latter would require an intensive study of the data for each country--a project beyond my competence and the scope of this paper.

Let me then state the tentative findings as follows. First, it seems that the net capital formation proportion, on bases comparable with those observed in Table 4, would range in the neighborhood of about 15 percent. This allows for a reduction of about a tenth to a fifth to offset the omissions in the denominator, and a further reduction of a few percentage points to allow for the price biases. The correct level may well be a little higher or lower; but this figure seems close enough to the 20-odd percent for the net capital formation proportions in Table 5 as well as to the 25 percent for the gross capital formation proportion for the U. S. S. R. Second, the capital formation proportions for the several Communist countries are strikingly similar, if the full period is taken into account. As calculated, they hover around 20 percent--despite the wide range in per capita income from its high in the U. S. S. R. to its low in China and Bulgaria.[7]

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6. See "Structural Changes in the Economy of the Chinese Mainland, 1933 to 1952-57," American Economic Review, Papers and Proceedings, Vol. XLIX, No. 2, May 1959, pp. 84-93, particularly Table 1, p. 86. Another estimate by Choh-Ming Li, yields a net capital formation total (at 1952 prices) of 57.5 billion yuans, and a net national product total of 552.6 billion yuans for 1952-57, or a net capital formation proportion of only 10.4 percent (see Economic Development of Communist China, University of California Press, 1959, Table XXXII, p. 136).

7. This uniformity of capital formation proportions among Communist countries may be a statistical illusion. If the upward bias in the estimates is greater in the low income countries, a correction for it may yield capital formation proportions significantly lower for them than for the high income countries. On the other hand, it may well be that the forced drive for industrialization lifts the capital formation proportions in the low income countries to as high a level as in those already more developed--despite the much lower per capita consumption in the former.

III. The Limits of Capital Formation Proportions

Two questions are suggested by the findings in Tables 1 to 5. First, why is the range in the capital formation proportions, domestic and even national, relatively narrow, even for the non-Communist countries? Second, why have the Communist countries, despite the compulsion and authoritarian drive to maximize capital formation, failed to raise their capital formation proportions above the approximate level of 15 percent on a net basis, or of 25 percent on a gross basis? Both questions can be reformulated for more effective discussion into questions in terms of the lower and upper limits of the capital formation fraction. Apparently, some constraints operate over the long period to prevent the capital formation proportions from either falling below a minimum or rising above a maximum level.

The problem of the lower limit is most directly relevant to the national rather than the domestic capital formation proportions: for the poorer countries the latter are usually higher than the former. It is, therefore, legitimate to ask why their national capital formation proportions (in Tables 1 and 4), the country-wide savings rates, are so high, despite their low per capita incomes. And the question leads to two others. First, is this relatively high nationwide savings fraction in the less developed countries a recent phenomenon not typical of their longer term past? Second, (whether or not the answer to this question is 'yes'), are there lower limits to the long-run national savings fraction?

If we may begin with the latter question, the first relevant observation is that within a country differences in income level among various population groups are associated with a wide range of differences in the savings-income fraction.[8] True, these findings are usually based on size distributions of income affected by transitory elements, and distorted in various other ways. But with all the qualifications recognized, one can hardly doubt that if a country's population were classified by secular levels of income, many important groups at the bottom of the array at any given time would have no savings or actually dissavings; while others in the upper ranges would have quite high savings fractions. There seems little question that the range of the savings fraction among income groups within a country is far wider for the same ranges in per capita income than the range that we found in international comparisons--of less than 2 to 1, while per capita income ranged at least from 10 to 1.

There is no contradiction between these findings. Setting aside for the moment the origin of a country's savings in its non-personal institutions--business corporations, public corporations, and governments--one can reasonably argue that even the personal savings-income fraction varies much less

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8. To cite a single example, for the United States: in 1950 the top tenth of spending units (in the Survey of Consumer Finances) accounted for 29 percent of income, and had a savings-income ratio of 20 percent. The lower nine-tenths of spending units accounted for 71 percent of income and had a savings-income ratio of 3 percent. The range from 3 to 20 percent in the savings-income ratio was thus associated with a range from 0.8 to 2.9, or less than 1 to 4, in income per unit (see Simon Kuznets, Shares of Upper Income Groups in Income and Savings, National Bureau of Economic Research, 1953, Table 54, p. 216).

among countries than among income groups within a country. The members of the latter are at different phases of their secular life cycle and the failure to save in some phases is a rational adjustment either to future prospects or to past performance. Thus, the younger members of the labor force, particularly in the early years of family formation, are often dissaving--drawing partly on their own past savings and partly on credit in expectation of the secular rise of their incomes and eventual reduction of their expenditures; and the retired or near-retired members of the labor force are also dissaving--drawing upon the fruits of their past work. In a sense the international situation is analogous to this differentiation within a country: nations with future prospects and pressing needs may finance much of their domestic capital formation by capital imports, and those that have reached maturity may to some extent draw upon their past external savings. But the analogy is limited since no country can incur net dissavings for any length of time without impairing its economic standing and thus losing these capital imports. Moreover, the very inequality of the size distribution of income within a country makes for positive, rather than negative, aggregate personal savings: the groups at the higher levels of per capita income are in a position to save. Indeed, the general process by which a population adjusts, at different economic levels, to the economic potentials provided by its aggregate product, is such that the consumption levels of contiguous economic levels are closely related and the upper income groups, even in low income countries, perforce have positive savings (although their incomes may be low compared with those of middle or even some low income groups in the developed countries). It is unrealistic to suppose that all such positive personal savings will be absorbed by loans to other members of the community for consumption purposes; part must be used to finance capital formation.

If one adds to personal savings the savings that originate in the business corporations and in the government--under the assumption of political stability and minimal administrative efficiency--it would seem that a positive nationwide savings fraction characterizes any country, no matter how underdeveloped and how low its per capita income. This, of course, would be true of the longer run: in the short run a natural calamity, e.g., a poor crop, or a man-made calamity, e.g., a war, can produce negative countrywide savings--even in highly developed countries, which are subject also to the effects of sharp cyclical contractions.

One final observation on the lower limit of capital formation proportions in the non-Communist countries relates to the pricing problem.[9] The capital components may be valued at higher prices, relative to prices of consumer goods, in the less developed countries than in the more developed countries. The relative cost of producers' durable equipment, particularly, is much lower in the more advanced, industrialized countries. The magnitude of this relative price problem is not negligible and can be illustrated by the figures for 1950 for Italy. In the tabulation below, we show the percentage proportions of gross capital formation to gross national product with Italian price weights, i.e., using Italian prices for capital and consumer goods, and with U.S.A. price weights.

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9. I am indebted to Professor Nicholas Georgescu-Roegen of Vanderbilt University for calling my attention to it.

Percentage Proportion of Gross Capital Formation to Gross National Product for Italy, 1950[10]

	Italian Price Weights	U. S. A. Price Weights
Producers' durable equipment	10.0	4.0
Construction:		
Residential	2.2	3.3
Other	5.6	5.3
Total	7.8	8.6
Gross fixed capital formation	17.8	12.6
Inventory accumulation	1.3	1.1
Net exports	0.1	0.1
Total gross capital formation, sum of above	19.2	13.8

The relative prices of machinery and equipment and, to a much lesser extent, of 'other' construction were much higher in Italy than in the United States; whereas the relative prices of residential construction were lower. The use of the price weights of the higher income country (U. S. A.) not only reduced markedly the aggregate capital formation proportion for Italy but also changed significantly the distribution of capital formation among types of capital goods.

If this bias is generally true, the use of the price weights of the more advanced countries would lower the capital formation proportions we now show for the underdeveloped countries. Therefore, one further explanation of the lower limit of the capital formation proportions in the less developed countries, as they are calculated in Tables 1 and 4, may be that, if some minimum of real capital formation is required, its high relative pricing in the less developed countries magnifies the capital formation proportions. In other words, these proportions, although they may be true as savings proportions, may be exaggerated as measures bearing upon real capital stock and product.

However, this upward bias in the capital formation proportions in the less developed countries may be offset by the failure to record substantial amounts of non-monetary capital formation. Thus for India, Wilfred Malenbaum's estimates suggest that in 1950/51 non-monetized investment constituted over a quarter of total net domestic investment.[11] Omission or understatement

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10. Calculated from Milton Gilbert and Irving B. Kravis, An International Comparison of National Products and the Purchasing Power of Currencies, The Organization for European Economic Cooperation, Paris, no date, Table 30, p. 119.

11. See East and West in India's Economic Development, National Planning Association, Washington, 1959, Tables 1 and 3, pp. 18 and 28.

of such investments in the low income countries, in which the non-monetary sector accounts for a large proportion of total product, is quite likely. But we cannot at present balance the upward bias due to high relative prices of capital goods against the downward bias due to the omission of non-monetized investment.

In any case, illuminating as the preceding observations are for any interpretation of capital investment in real terms, they do not touch upon the lower limit of the national savings fraction--except to suggest that the latter can, in a sense, be propped up by the need for a minimum of supplies of real capital, particularly of the higher priced types of machinery and equipment. We can terminate the discussion of the first question by asserting that under the assumed conditions of political stability and internal and external peace the lower limit of the long-term national savings proportion is significantly above zero.

However, we can argue, in response to the second question, that the fractions shown for the low income, underdeveloped countries for recent years in Tables 1 and 4--omitting the Communist countries for the time being--are too high to be plausible approximations to the fractions in the long run, especially in those countries in Asia and Africa (and some in Latin America) in which long-term population growth was, until the very recent decades, quite moderate. For if we assume that population grew less than 1 percent per year[12] and that per capita income did not rise significantly, a long-term net capital formation proportion as high as 8.1 percent, or a net domestic capital formation proportion as high as 9.2 percent (see Table 4) is inconsistent with what we know, or can reasonably assume, about the reproducible capital-output ratios in the less developed countries. The evidence assembled in Appendix B of Paper IV suggests an average reproducible capital-output ratio for the less developed countries of between 2-1/2 and 3-1/2; and a recent estimate for 1950 for India (1.8) is much lower.[13] A net national capital-output ratio of 3.0 and a net capital formation proportion of 8 percent would mean an annual rate of growth in net national product of 2.7 percent; and with population growing, let us say, 1/2 per cent per year, would mean a rise in real income per capita of about 2.2 percent per year, or doubling in about 32 years. No such rise in per capita income could have occurred from the mid-19th century to the present in the populous countries of Asia (except Japan) or among the indigenous populations of most African and many Latin American countries. Indeed, if we assume no rise in per capita income, a capital-output ratio of 3, and a 0.5 percent per year rise in population, the implicit net capital formation proportion would be 1.5 percent.

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12. From 1850 to 1900 the population of Asia grew at the rate of 5.5% per decade; that of Africa at the rate of 7.1% per decade. For 1900-50 the corresponding rates of growth per decade were 8.2% for Asia and 7.1% for Africa (see United Nations, The Determinants and Consequences of Population Trends, New York, 1953, Table 2, p. 11).

13. See Paper IV, Appendix Tables 2 and 3, pp. 63 and 65. For the recent estimate for India see Raymond Goldsmith and Christopher Saunders, ed., The Measurement of National Wealth, Income and Wealth, Series VIII, International Association for Research in Income and Wealth, London, 1959, Table VII, p. 32.

While this may be too low an estimate, an assumption of insignificant growth of per capita income over the long run, a secular capital-output ratio of between 3 and 5, and a rate of growth of population of 1 percent per year (which is quite high even for some of the less crowded underdeveloped countries), would yield an implicit net capital formation proportion of less than 5 percent. It seems reasonable to suggest that this proportion in the long run must have been not over 5 percent in most of the underdeveloped countries, except those in Latin America. It follows that the international spread in the net (and gross) capital formation proportion over the long period before the recent years was probably much wider than in recent decades--from 5 to 15 percent or more.

However, these greater differences between the high and low income countries in their net capital formation proportions were not necessarily a major factor determining the marked differences in their rates of growth and the growing disparity in their per capita incomes. Despite possible differences in the capital-output ratios, and differing relations between material capital investment and other productive factors, the net capital formation proportions themselves may have been only the symbol, the outward index of far more important underlying factors that determined the rates of growth. And yet it is useful to record that, insofar as the empirical data permit some reasonable inference, the relatively narrow range in the net capital formation proportions among countries grouped by per capita income, shown in Tables 1 and 4, was probably true only for the post-World War II years; and that the range over the longer past, say from the mid-19th century to World War II, must have been much wider.

We turn now to the upper limit on the capital formation proportions, again dealing with the proportion of national capital formation to national product. The first relevant observation is that, given the growth of per capita income noted in the developed countries, net capital formation proportions far higher than 15 percent seem feasible. Thus, if per capita income grew at a rate of some 20 percent per decade, and if the initial capital formation proportion was say 10 percent, within less than 40 years per capita income would have doubled; and if all of the increase in income per capita was used for capital formation, the capital formation proportion at the end of four decades would have been more than 110 over 200, or over 55 percent. Note that in many countries with such rises in per capita income, the initial levels of per capita consumption were satisfactory by the standards of the time, and no apparent great hardship is involved in assuming the allocation of the entire increment in per capita income to capital formation. (We could allow for the gradual rise in the capital formation proportion and its effect on the rise in per capita income; but there is no need to complicate the illustration.) The point is simply that a sharp rise in per capita income even with a relatively moderate net capital formation proportion of 15 percent would permit secularly higher net capital formation proportions than have been recorded.

At best, the net capital formation proportions have not gone much above 15 percent, either in the non-Communist or in the Communist countries. The explanation is perhaps easier for the former than for the latter. After all, in the non-Communist countries personal savings have been a major source of net capital formation financing; and the decisions by individuals on the use of income under conditions of technical progress and social change which supplied continuous stimuli to expanded consumption and reduced the propensity to save, could easily limit the overall national savings fraction. Briefly, the limits on

the national savings rate can be viewed as the result of a complex of factors that restrict net savings by households, net retained profits of corporations, and net savings of governments--all expressed as fractions of national product. In a free market society, the checks upon the net savings of governments can be associated with the effort to limit government's role in economic activity to the indispensable types of overhead capital where the social returns much exceed the private. The limits upon net income retention by business corporations are set partly by the control over corporations of the public security markets, and partly by the income taxing power of government. And the limits upon personal savings stem partly from the restraints upon inequality in the size distribution of income, which prevent the share of upper income groups from rising and, in fact, in many developed countries in recent decades brought about a decline in this share; partly from the fact that savings in the middle and lower income ranges can be justified only in terms of a calculated choice between future and current consumption, a choice that sets a fairly low upper limit to the savings-income rate for groups below the top. It would be a bold analyst indeed who could, with this analytical skeleton at hand, demonstrate that these factors determine a maximum net capital formation proportion of 15, rather than 10 or 30 percent. Yet there is no puzzle about the limit on the national savings rate in countries that are sufficiently free to allow, if not complete consumer sovereignty, at least a dominant weight to personal decisions concerning the allocation of resources between the present and future; and that are sufficiently dynamic and responsive to pressures of economic groups to damp and ameliorate income and other inequalities arising from the operation of free markets.[14]

The case of Communist countries is somewhat more puzzling, for here we have nations which, with ruthless exercise of authoritarian power and with severe curbs on the consumption demand of households, attempt to maximize the production of capital equipment. It is apparently so much a major goal of Communist society that the slogan "Accumulate, accumulate! That is Moses and the prophets!"[14a] appears to be a fair description. Under such conditions why should the net capital formation proportion hover between 15 and 20 percent--even in a country like the U. S. S. R. which presumably has had plenty of experience with centralized planning and emphasis on capital accumulation?

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14. For a more detailed discussion of the factors that limit the national savings or net capital formation rate in a country like the United States see two of my earlier papers: "Proportion of Capital Formation to National Product," American Economic Review, Papers and Proceedings, Vol. XLII, No. 2, May 1952, particularly pp. 509-13 and 521-24; and "International Differences in Capital Formation and Financing," in Moses Abramovitz, ed., Capital Formation and Economic Growth, Princeton University Press for the National Bureau of Economic Research, Princeton, 1956, pp. 19-111, particularly pp. 46-50 and the appendixes referred to therein. Further detailed discussion of the United States record is contained in my Capital in the American Economy: Its Formation and Financing, National Bureau of Economic Research, mimeographed, in press by mid-1960.

14a. Karl Marx, Capital (Modern Library ed.), New York, 1937, p. 652.

We cannot answer the question by a detailed examination of the statistics for the Communist countries. As already indicated, such a task is beyond our competence; and we hope that our inference that the net capital formation proportion even in the Communist countries does not exceed in the long run (at least in the past) about 15 percent (give or take a few percentage points) is consistent with the available evidence. The purpose here is to consider in rather general terms what may be involved. We shall not assume that the initial structure with which we deal is one that follows immediately upon a revolution and collapse of the preceding social order--conditions under which all Communist regimes actually begin. Rather we shall assume fairly normal initial levels, i.e., relatively full utilization of resources within an established social framework, and consumption levels that, if not necessarily ample, are at least adequate for a minimum standard of living.

A hypothetical example can indicate the possible rise in the net capital formation proportion and its implications. In this example we begin with the structure of national product allowing 15 percent for net capital formation, 10 percent for government consumption, and 75 percent for private consumption. The average and marginal capital-product ratios are assumed to be 3. And, to simplify calculations, we hold population constant, and assume that total personal and government consumption will also remain constant and that all the increase in national product will be devoted to capital formation. The results for a few years will then be:

	Year 1	Year 2	Year 3	Year 4
Capital, beginning of year	300	315	335	361.7
Net product	100	105	111.7	120.57
Net capital formation	15	20	26.7	35.57
NCF proportion, %	15.0	19.0	23.9	29.5
Govt. consumption	10	10	10	10
Private consumption	75	75	75	75

The calculation is simple: in each year we derive national product from the stock of reproducible capital available at the beginning of the year and the average capital-product ratio; and we derive the stock of capital at the beginning of the year by adding to the capital stock at the beginning of the preceding year the volume of net capital formation. The example could be expressed algebraically; and it could be made more realistic by allowing population and household and government consumption to grow, the latter even on a per capita basis. But if the other assumptions are retained, and if the rate of growth of consumption is significantly lower than that of national product, the result will be the same--a rapid rise in the net capital formation proportion. In our example the effect is exaggerated; but the more realistic illustration would also reveal a doubling of the initial net capital formation proportion within a decade, if not in three years.

What are the essentially questionable elements in the illustration? The first to be noted is that the marginal (and the average) capital-output ratio remains constant, despite the marked increase in total capital relative to total labor. With full employment of resources assumed, and no trend in the ratio of labor force to population, constant population means constant labor force and labor input. Yet capital increases from 300 to 362. Is it reasonable to assume that capital will increase relative to labor, but that the effect of additions to capital on additions to product will remain unchanged? Obviously, if we assume that the initial combination of capital and labor (i.e., in year 1) is the optimum under the existing technology, and that any rise in the ratio of capital to labor produces a proportional reduction in the contribution of capital (i.e., a proportional rise in the capital-output ratio), the capital-output ratio from year to year will move exactly as the total capital stock moves, i.e., from 3.00 to 3.15 to 3.35 and so on. Net product will then be held down to 100, and the net capital formation proportion to 15 percent.

There is no reason to assume that technological patterns--either changes in production functions or in product mix--could not be modified so that a combination of factors in which capital increases relative to labor will still yield a constantly high addition to product per unit addition to capital. Yet at any given time existing technology does imply, particularly with respect to specific categories of output (e.g., producers' goods so emphasized in the Communist pattern of production), a range of optimal mixtures of capital and labor. A shift from the initial scarcity of capital per labor unit to its relative plenitude would, all other conditions being equal, mean a decreasing net addition to product per unit addition of capital, i.e., an increasing marginal capital-output ratio; and passing the optimal combination may involve, short of major technological changes, a further rise in this ratio. It may well be that the optimal mixture has been set by the technology of the more advanced non-Communist countries, and if it is adopted with only minor adjustments, a proliferation of capital goods relative to labor may mean either a rising capital-output ratio in the sectors saturated with capital goods; or a decline in overall productivity in the sectors starved of capital investment (and perhaps flooded with the overflow of labor from the capital-favored sectors). If this happens, the outward manifestation will be difficulty in raising productivity, and an increasing capital-output ratio whenever the capital formation proportion advances beyond the optimal level in current technology (with whatever modifications are needed in the individual Communist countries).[15]

15. One aspect of the discussion connected with the index number problem should be noted. If the capital goods whose production is stressed in the attempt to raise the capital formation proportion are valued at their high, initial year prices, the increase in this proportion and in the total product will be large. Retention of the initially high prices as the basis of valuation will therefore result in higher capital formation proportions--probably well above the 15 to 20 percent suggested for recent years for the Communist countries. On the other hand, the shift to valuation at terminal prices will tend to keep the capital formation proportions down. One can thus argue that the upper limit on capital formation proportions is to some extent a result of measurement practices--of the use of terminal rather than initial price weights. But this is not as arbitrary as it may seem. An increase in capital relative to labor should lead to a lower valuation of the former--and we are, in a sense, back to the real issue of the optimal combinations of labor and capital under the limiting conditions of existing technology.

A related factor is the possibly higher capital-output ratio for the capital goods sector than for the consumption components of national product. If we assume initially (and continuously) a ratio of 2.6 for the consumption sector and 5.27 for the capital formation (which, weighted, yield 3.0 for the nationwide ratio in year 1), capital stock at the beginning of year 4 would be 354 (not 361.7), the nationwide capital-output ratio (under the assumption of constancy of sectoral ratios) would be 3.2 (not 3.0) in year 4, national product would be 110.2 (not 120.6), and the net capital formation proportion would be 22.9 (not 29.5) percent. The combination of a higher capital-output ratio for capital formation with a possible increase in this ratio because of the increase in the supply of capital relative to labor in this sector, could limit any rise in net capital formation proportions severely.

But the weight of these factors on the supply or production side is an unknown quantity; and I am inclined to assign greater weight to the pressures for a greater consumption share--pressures that, despite the authoritarian ruthlessness of Communist regimes, are effective enough to claim a sufficient share of the national product and set fairly narrow limits to the rise of the capital formation proportions. I cannot identify or quantify the sources of these pressures in detail, but it is not difficult to see where they originate.

There are two broad categories. One stems from what might be called the production implications of the industrialization shifts aimed at by the attempt to maximize capital accumulation under the Communist regimes. Thus, the shift of population from rural to urban communities means necessarily a rise in per capita consumption, in the resources that have to be employed, if the real standard of living is not to decline even moderately. The assurance of shelter, sanitary, and transportation services is far more costly for urban than for rural population. Consequently, constancy of personal consumption per capita (as usually measured) implies a decline in the real levels of living when there is a shift of population to urban communities (or within them to greater metropolitan centers); and the larger the shift, the greater the decline. Second, increasing industrialization requires a more highly skilled and literate labor force, and hence a greater input of resources--on a per capita basis--into some components of consumption expenditures. This also means that with consumption per capita constant, and a greater proportion devoted to education, training, and the related services, certain other elements of consumption are being reduced. Third, since repression of the labor force without differential inducements is highly unproductive, particularly in combination with an increasing stock of capital which renders unresponsive labor all the more expensive, differential compensation in a system of widely ramified incentives to at least a limited part of the labor force is indispensable. But this means a rise in the living standards of some groups in the population (ranging from plant managers to Stakhanovites to other 'heroes' to the more skilled and responsive groups of the Communist labor force) and with a constancy in per capita consumption for total population, the standard of living of other groups must go down--to compensate for the rise in the consumption standards of the favored groups. There may be other aspects of the same broad connection between attempts to force capital accumulation without impairing the overall productivity and consumption of the economy; but it all comes down to the introduction of wide differentials in consumption standards among various groups in the population, and particularly to the increase in the standards of those groups whose contribution is viewed as strategic in assuring the efficiency of capital. Such differentiation implies decline or

reduction in consumption standards of other groups--an absolute reduction if per capita consumption for the country is not allowed to rise. Obviously, there are limits to such a process: if carried too far it would mean either an explosion or an increase in repressive forces needed to hold the lid down--which would raise consumption anyway, since it would necessitate larger outlays on police. Thus mere considerations of capital efficiency might force a substantial rise in per capita consumption; and the assumption in the illustration above of constancy in consumption is unrealistic. A rise in per capita consumption, combined with a rise in population, can account for a large fraction of the marginal increment to national product and thus limit the rise in the net capital formation proportion.

The other source of pressures for rising per capita consumption in the Communist countries is the international demonstration effect (and in some of the satellite countries the remembrance of the past). Since the Communist are follower countries, having come late to the spread of industrialization, they tend to combine imitation with attempts at self-conscious differentiation. Whether the developed non-Communist countries are viewed as something to catch up with or surpass, or as enemies whose strength is to be feared, or as examples of what should be avoided, an attempt is being made constantly to learn from them--if with discrimination. Undoubtedly, the higher consumption standards of the more advanced non-Communist countries are an important element in the situation which, despite the attempts of Communist regimes at isolation, exercise major effects, if not on the broad groups in the population (although even they are being increasingly affected), then on the economic and social elites who have had greater opportunity to observe and learn from the economic and social patterns of other countries and who are more influential in deciding upon the allocation of resources in their own countries. Thus, just as the technological attainments of the more advanced non-Communist countries affect the production patterns of the Communist countries, so do the consumption patterns--whenever the strain of backwardness is sufficiently relieved to allow the operation of competitive patterns of ultimate consumption to assume sufficient prominence.[16]

The preceding, rather general comments, are in the nature of conjectures insufficiently grounded in detailed consideration of the economic statistics for the Communist countries to permit an approximation of the maximum long-term capital formation proportions in these countries. In particular, nothing in these comments suggests that over the long run, given satisfactory consumption standards and compatibility of Communist authoritarian regimes with a plenitude of consumer goods and freedom of consumers to choose what they want (which is a big assumption indeed), a planned direction of the economy could not sustain net capital formation proportions much higher than the 15 to 20 percent prevailing today. But dealing with this question would involve us in speculation on the tenability of the basic assumption that the highly authoritarian type of Communist regime can be retained after the process of initial capital accumulation and of transition to industrialization has been completed. It may well be modified beyond recognition once these transition processes have given place to

16. The official estimates for the Communist countries do show a substantial rise in per capita household consumption for recent post-World War II years (usually from 1952 to 1957); but much of it must be making up for the declines sustained during the war and immediate post-war years.

a high level of production and sufficiently high levels of consumption among the upper economic groups to provide increasing pressure for more freedom of other consumers in determining the allocation of resources in the economy. Such speculation is beyond the scope of the present discussion, but it is not irrelevant--because it points clearly to the connection between such technical matters as capital formation proportions and the whole structure of the social system that allocates resources and the possible responsiveness of this system to changes in absolute and relative levels of economic performance.

IV. Structure of Domestic Capital Formation by Type of Capital Good and by Industrial Use

The present section deals with the structure of domestic rather than national capital formation. Foreign capital imports and exports (i.e., net changes in claims against foreign countries) bear a high ratio to the increment to national product--high relative to the ratio of domestic capital formation to addition to product. Thus, on the generous assumption of a long-term yield of 10 percent, the capital-output ratio for foreign capital is 10, compared with countrywide domestic gross capital-output ratios ranging not much above five and net ratios not much above three. The subtraction of capital imports thus makes the national capital-output ratio too low--compared with exactly the same complex of capital goods financed internally; and the addition of capital exports makes the national capital-output ratio too high--compared with exactly the same amount and structure of domestic capital formation. It is therefore more convenient to deal with the structure of domestic capital formation--if it is of interest in the analysis of effects of capital on the growth of product--although allowance can easily be made for the effect of varying shares of net changes in claims against foreign countries.

Table 6 summarizes the distribution by type of capital good of gross domestic capital formation, since gross volumes are available for many more countries than net. Even so, for most components the number of countries is too small to permit distinction of all seven Roman numeral groups; and we limit the table to the four wider groups. Averages are presented for all countries (columns 1-4) and for the sample excluding politically and financially dependent units (columns 5-8).

Some broad findings can easily be suggested. First, the share of inventory accumulation in gross domestic capital formation varies from 4 to 10 percent or, for the more representative sample, from 5 to 11 percent (line 10). Since the proportion of capital consumption to gross domestic capital formation is about four-tenths (see Table 4, line 4), a 4 percent share of inventory accumulation in gross domestic capital formation means a 7 percent share in net domestic capital formation; and an 11 percent share in the former means a 19 percent share in the latter.

The share of inventory accumulation in gross (and presumably net) domestic capital formation is negatively associated with per capita income: it is somewhat higher in the low income groups. In the smaller and more representative sample, the share for Groups VI and VII is 11 percent whereas that for Group I is 7 and that for Groups II and III, 5 percent. This may be due to the fact that the inventory-domestic product ratio is at least no lower in the less

Table 6.
Distribution of Gross Domestic Capital Formation by Type of Capital Good, Countries Grouped by Per Capita Product, Post-World War II Years (Based on current price totals)

	Groups of Countries by Per Capita Product							
	All Countries				Countries Excluding Politically & Financially Dependent Units			
	I (1)	II & III (2)	IV & V (3)	VI & VII (4)	I (5)	II & III (6)	IV & V (7)	VI & VII (8)
Dwellings								
1. Number of countries	7	9	4	6	7	6	3	3
2. Ratio to gross domestic capital formation (%)	21.9	22.2	19.1	17.2	21.9	20.9	16.2	16.9
Other Construction								
3. Number of countries	6	9	2	6	6	6	1	3
4. Ratio to gross domestic capital formation (%)	33.6	30.7	36.2	39.6	33.6	26.9	42.0	35.3
All Construction								
5. Number of countries	6	11	5	12	6	8	3	7
6. Ratio to gross domestic capital formation (%)	55.5	52.2	50.7	54.6	55.5	48.1	48.9	53.4
Producers' Equipment								
7. Number of countries	5	11	5	11	5	8	3	6
8. Ratio to gross domestic capital formation (%)	38.7	43.6	38.7	34.4	38.7	47.1	43.0	33.6
Increase in Stocks								
9. Number of countries	7	12	14	13	7	9	10	7
10. Ratio to gross domestic capital formation (%)	7.1	4.3	9.4	9.8	7.1	4.9	9.5	10.9

Ratios are unweighted arithmetic means of percentages for individual countries given in Appendix Table 2.
For countries excluded from columns 5-8 see notes to Table 1.

developed countries than in the high income, more developed countries. The greater importance of agriculture with its large seasonal inventories, and the greater difficulties of transportation and communication in the less developed countries would make for a higher countrywide inventory-product ratio; although this may be offset by longer production periods (and hence greater relative volumes of stock in process) in the industrial sectors of the more developed countries. If the countrywide inventory-domestic product ratio is as high in the less developed countries as in the more developed, the ratio of additions to inventories to current product also need not be lower; and, indeed, as we saw in Table 1, the ratio for Groups VI and VII is about the same as that for Group I and somewhat higher than that for Groups II and III. But equality among wide groups of the ratio of inventory change to domestic product combined with a lower ratio of total domestic capital formation to domestic product in the less developed countries than in the more developed necessarily means a higher ratio of inventory change to domestic capital formation in the former. The findings in Table 6 are thus consistent with those in Table 1.

Second, of the 89 to 96 percent of domestic capital formation represented by fixed capital, construction accounts for somewhat under six-tenths and producers' equipment for somewhat over four-tenths. There are some differences in this distribution among groups of countries. Thus for the larger sample of countries the share of construction in gross fixed capital formation shifts from 59 percent in Group I, to 55 percent in Groups II and III, to 57 percent in Groups IV and V, and is as high as 61 percent in Groups VI and VII; the share of producers' equipment varies correspondingly from 45 to 39 percent (based on columns 1-4, lines 6 and 8). But these differences assume significance only if we infer, on the basis of data cited above for Italy, that prices of producers' equipment relative to prices of construction are much higher in the less developed than in the more industrialized countries. This means that conversion to the same relative price structure would yield a distribution of fixed capital formation in which the share of construction would be significantly larger in Groups VI and VII, and perhaps even in Groups IV and V, than in Group I or Groups II and III; and that of producers' equipment correspondingly lower.

Third, the share of residential construction in domestic capital formation ranges from 17 to 22 percent (columns 1-4, line 2); in fixed capital formation from 19 to 23 percent (based on columns 1-4, lines 2, 6, and 8). It is a substantial segment of total capital investment--although in some ways it can be viewed as a consumer rather than a capital good. As estimated in Table 6, the share is somewhat lower in the less developed than in the more developed countries: residential construction in Groups VI and VII is 17 percent of domestic capital formation and 19 percent of fixed capital formation--compared with 22 and 23 percent in Group I. Correspondingly, the shares of other construction in both gross domestic capital formation and fixed capital formation are somewhat higher in the less developed countries: the former is 40 percent in Groups VI and VII, 34 percent in Group I and 31 percent in Groups II and III (columns 1-4, line 4); the latter is 44, 36, and 32 percent respectively (based on columns 1-4, lines 4, 6, and 8). But here again we face the question of the effects of the relative price structure. The illustrative data for Italy suggest that the prices of other construction relative to residential are significantly higher in the low income than in the high income countries. It may well be that the differences among the groups of countries in the distribution between residential and other construction merely reflect relative price differences and would disappear if the estimates were converted to the same price structure.

Thus the findings tentatively suggested by Table 6 are a lower share of producers' equipment, and higher shares of inventory accumulation and of construction in gross domestic capital formation in the low income, less developed countries than in the high income, more developed countries.

It would have been of interest to construct a parallel table for the Communist countries. However, only scraps of information for the U.S.S.R., China, Poland, Hungary, and Yugoslavia are easily available. With the usual allowances for the necessary qualifications, the following observations can be made.

First, the share of inventory accumulation in either net or gross capital formation (almost all of it domestic) is quite high. Thus in the U.S.S.R. the ratio of inventory accumulation to total gross investment is estimated to be 14 percent for 1949-55.[17] In Mainland China, Choh-Ming Li's more detailed estimates, in the source cited in footnote 6 above, indicate a share of inventory accumulation in total net capital formation of over 19 percent for 1952-57. In Hungary, the ratio of inventory accumulation to net domestic capital formation was about 38 percent, either for 1951-54 or 1954-57; in Poland it was 36 percent for 1951-54 and 34 percent for 1954-57; in Yugoslavia it was less than 10 percent for 1952-56.[18] By and large, inventory accumulation seems to be a much higher proportion of domestic capital formation, gross or net, in the Communist than in the non-Communist countries--even the less developed areas within the latter. While in the early post-war years this may have been the result of purposeful replenishment of reserves depleted in the preceding years of war and turmoil, the persistence of the high ratio can reasonably be interpreted as a reflection of the difficulties in centralized planning: of bottlenecks on the one hand and of the accumulation of useless inventories on the other.

Second, we have little information on the distribution of fixed capital formation between construction and producers' equipment. The sources cited in the preceding paragraph suggest about two-thirds for construction and a third for equipment for Mainland China; and about a fifty-fifty division between construction and equipment for Yugoslavia. The distribution is not very different from that in Table 6 for the non-Communist countries, but it may well be that the share of equipment in fixed capital formation is somewhat higher in the Communist countries.

Third, whether construction is a half or two-thirds of fixed capital formation in the Communist countries, the share of residential construction is quite low--much lower than in the non-Communist countries. The estimates by Norman Kaplan for the U.S.S.R. yield a share of residential construction in total gross investment of 9.2 percent for 1928/29-32, and 9.1 percent for 1933-37; but rising to 16.9 percent for 1947-51, the latter figure affected by reconstruction after World War II.[19] I could not find more recent estimates, but the

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17. O. Hoeffding and N. Nimitz, Soviet National Income and Product, 1949-55, Rand Memo, RM - 2101, April 6, 1959, App. Table 36, p. 180.

18. Yearbook of National Accounts Statistics, 1958, United Nations, 1959.

19. See Abram Bergson, ed., Soviet Economic Growth, Conditions and Perspectives, Evanston, 1953, Table 2.12, p. 61.

data in Hoeffding and Nimitz (cited in footnote 17) on growth of the stock of dwelling units do not suggest any rise in the ratio over that indicated for 1947-51. For Mainland China, Li's estimates indicate a ratio of housing construction to total net capital investment of only 8 percent. For Poland, Alexander Erlich indicates a share of housing in gross fixed investment for 1950-55 of only 10.4 percent, with the plan for 1956-60 scheduling a rise to 16.2 percent.[20] Scattered as the data are, it is clear that residential construction has been a much lower fraction of total capital investment in the Communist countries than in the non-Communist--even the less developed countries among the latter (in Groups VI and VII).

The distribution of domestic capital formation by industrial use is of obvious interest in indicating the most favored industrial sectors in the channeling of investment within the country. Unfortunately, this distribution is available for fixed capital formation alone; and, more important, for only seventeen countries in the post-World War II years. Because there are so few countries, we show the shares of the industrial sectors in gross fixed capital formation for each and also give the unweighted means of the shares for the seven countries in Groups I and II; the six countries in Groups III, IV, and V; and the four countries in Groups VI and VII (Table 7, Panel A).

Despite the small sample, the differences in structure of gross fixed capital formation by industrial use among countries at different levels of per capita income stand out clearly. First, as we move down the array by per capita income, the share of fixed capital formation channeled into the agricultural sector increases, from an average of 8 percent for Groups I and II to 26 percent for Groups VI and VII. Second, the share of fixed capital formation devoted to mining, manufacturing, construction, and power is about the same for the three broad groups of countries--the differences between the 30 percent for Groups I and II, 28.4 percent for Groups III, IV, and V, and 28.1 percent for Groups VI and VII are too small to be significant. Nor are there significant differences among the three groups in the average share of fixed capital formation devoted to the other 'industry' sector--transportation and communication--which is about 15 percent. Thus the share of the M+ sector in fixed capital formation is about 43 to 45 percent for each of the three wide groups of countries. Third, the average share devoted to residential housing drops from over 20 percent of fixed capital formation for Groups I and II, and III, IV, and V, to 14 percent for Groups VI and VII--although the latter is probably an underestimate, in view of the evidence in Table 6. Far more significant is the decline in the share of other services in fixed capital formation, which drops from 17 percent in Groups I and II to 9 percent in Groups VI and VII. This, together with the decline in the share devoted to dwellings, produces a drop in the share of all services (excluding transportation and communication) in fixed capital formation from 47 percent in Groups I and II to 31 percent in Groups VI and VII.

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20. See "The Polish Economy after October 1956: Background and Outlook," American Economic Review, Papers and Proceedings, Vol. XLIX, No. 2, May 1959, Table 3, p. 112.

Table 7.
Distribution of Gross Fixed Capital Formation by Industrial Use Compared With Distribution of Gross Domestic Product by Industrial Origin, Selected Countries, Post-World War II Years (Based on current price totals, 1951-1957 unless otherwise indicated)

Country and Distribution	Agriculture, Forestry, & Fishing	Mining, Manufact., Const., Elec., Gas, & Water	Transport. & Communication	M+ Sector (2+3)	Dwellings	Public Admin.	Other Services	All Services (5+6+7)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Share in Gross Fixed Capital Formation at Market Prices (%)								
Groups I and II								
1. United States	5.4	28.3	7.3	35.6	26.1	14.6	18.1	58.8
2. Canada	8.7	34.2	12.3	46.5	19.9	10.9	14.0	44.8
3. United Kingdom	3.9	41.7	11.1	52.8	21.7	3.3	18.3	43.3
4. Netherlands	6.4	31.5	16.8	48.3	20.0[c]	12.2	13.1[c]	45.3
5. Norway	9.6	28.6	28.0	56.6	17.1	8.3	8.2	33.6
6. Denmark (1951-56)	8.2[a]	16.0[b]	21.1	37.1[b]	16.0	1.9	36.8[b]	54.7[b]
7. Finland[d]	12.4	29.9	7.6	37.5	28.4	15.9	5.8	50.1
8. Average of Groups I and II	7.8	30.0	14.9	44.9	21.5	9.6	16.9	47.2
Groups III, IV, and V								
9. Austria	14.5	n.a.	13.0	n.a.	19.8[c]	9.4	n.a.	n.a.
10. Ireland	9.2	28.5	16.2[c]	44.7[c]	19.3	3.6	23.4[c]	46.3[c]
11. Israel	22.6	24.5	12.2	36.7	32.8[c]	0.7	7.2[c]	40.7
12. Italy (1952-56)	13.2	32.3	15.9	48.2	23.6	9.6	5.5	38.7
13. Greece	7.9	23.4[b]	18.5	41.9[b]	31.9	2.7	15.6[b]	50.2[b]
14. Portugal	11.6	33.4	16.3	49.7	22.1	5.7	10.9	38.7
15. Average of Groups III, IV, and V	13.2	28.4	15.2	44.1	24.2	5.3	10.7	42.1

(Continued on next page)

Table 7 (Cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Groups VI and VII								
16. Ecuador (1951-55)	26.3	30.5	13.4	43.9	11.3	11.7	6.8	29.8
17. Honduras (1951-55)	33.7	13.2	14.1	27.3	23.5	3.9	11.6	39.0
18. Taiwan	24.5	38.1	11.6	49.7	n.a.	6.6	n.a.	25.9
19. South Korea (1955-57)	18.6	30.6	22.0	52.6	6.9	13.5	8.5	28.9
20. Average of Groups VI and VII	25.8	28.1	15.3	43.4	13.9	8.9	9.0	30.9
B. Share in Gross Domestic Product at Factor Cost (unless otherwise indicated) (%)								
Groups I and II								
21. United States (net domestic product)	5.4	40.8	6.6	47.4	2.5	12.0	32.7	47.2
22. Canada	10.4	40.7	9.2	49.9	4.1	6.3	29.4	39.8
23. United Kingdom	4.9	49.0	8.5	57.5	3.1	6.8	27.6	37.5
24. Netherlands	12.2	41.3	9.5	50.8	n.a.	7.2	n.a.	36.9
25. Norway (market prices)	13.8	38.4	18.3	56.7	2.0	4.0	23.5	29.5
26. Denmark (1951-56)	20.2	29.9[b]	9.3	39.2[b]	3.9	8.7	28.0[b]	40.6[b]
27. Finland	23.5	41.3	7.6	48.7	3.4	9.3	14.9	27.6
28. Average of Groups I and II	12.9	40.2	9.9	50.1	3.2	7.8	26.0	37.0
Groups III, IV, and V								
29. Austria (gross national product, market prices)	14.5	53.6[e]	5.0	58.6[e]	n.a.	7.8	n.a.	27.0[e]
30. Ireland	32.2	26.7	n.a.	n.a.	1.9	9.4	n.a.	n.a.
31. Israel (net domestic product)	11.8	29.3	7.8	37.1	n.a.	20.1	n.a.	51.1

32. Italy (1952-56)	23.6	41.4	6.5	47.9	1.7	10.2	16.5	28.4
33. Greece	35.1	21.3[b]	6.3	27.6[b]	6.2	7.8	23.4[b]	37.4[b]
34. Portugal	29.1	37.9	5.0	42.9	4.0	5.1	19.0	28.1
35. Average of Groups III, IV, and V	24.4	31.3	6.1	38.9	3.5	10.1	19.6	36.2
Groups VI and VII								
36. Ecuador (1951-55)	38.9	21.3	5.1	26.4	7.5	5.7	21.4	34.6
37. Honduras (1951-55)	50.8	15.5	5.3	20.8	6.6	3.2	18.6	28.4
38. Taiwan[f]	33.8	25.5	5.2	30.7	n.a.	11.2	n.a.	35.4
39. South Korea (1955-57)	45.8	13.5	2.7	16.2	7.1	7.0	23.8	38.0
40. Average of Groups VI and VII	42.3	19.0	4.6	23.5	7.1	6.8	21.3	34.1
C. Ratio of Share in Gross Fixed Capital Formation to Share in Gross Domestic Product								
Groups I and II								
41. United States	1.00	0.69	1.11	0.75	10.44	1.22	0.55	1.25
42. Canada	0.84	0.84	1.34	0.93	4.85	1.73	0.48	1.13
43. United Kingdom	0.80	0.85	1.31	0.92	7.00	0.49	0.66	1.15
44. Netherlands	0.52	0.76	1.77	0.95	n.a.	1.69	n.a.	1.23
45. Norway	0.70	0.74	1.53	1.00	8.55	2.08	0.35	1.14
46. Denmark	0.41[a]	0.54[b]	2.27	0.95[b]	4.10	0.22	1.31[b]	1.35[b]
47. Finland	0.53	0.72	1.00	0.77	8.35	1.71	0.39	1.82
48. Average of Groups I and II	0.69	0.73	1.48	0.90	7.22	1.31	0.62	1.30
49. Ratio, line 8 to line 28	0.60	0.75	1.51	0.90	6.72	1.23	0.65	1.28

(Continued on next page)

Table 7 (Cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Groups III, IV, and V								
50. Austria	1.00	n.a.	2.60	n.a.	n.a.	1.21	n.a.	n.a.
51. Ireland	0.29	1.07	n.a.	n.a.	10.16	0.38	n.a.	n.a.
52. Israel	1.92	0.84	1.56	0.99	n.a.	0.03	n.a.	0.80
53. Italy	0.56	0.78	2.45	1.01	13.88	0.94	0.33	1.36
54. Greece	0.23	1.10[b]	2.94	1.52[b]	5.15	0.35	0.67[b]	1.34[b]
55. Portugal	0.40	0.88	3.26	1.16	5.52	1.12	0.57	1.38
56. Average of Groups III, IV, and V	0.73	0.93	2.56	1.17	8.68	0.67	0.52	1.22
57. Ratio, line 15 to line 35	0.54	0.91	2.49	1.13	6.91	0.53	0.55	1.16
Groups VI and VII								
58. Ecuador	0.68	1.43	2.63	1.66	1.51	2.05	0.32	0.86
59. Honduras	0.66	0.85	2.66	1.31	3.56	1.22	0.62	1.37
60. Taiwan	0.72	1.49	2.23	1.62	n.a.	0.59	n.a.	0.73
61. South Korea	0.41	2.27	8.15	3.25	0.97	1.93	0.36	0.76
62. Average of Groups VI and VII	0.62	1.51	3.92	1.96	2.01	1.45	0.43	0.93
63. Ratio, line 20 to line 40	0.61	1.48	3.33	1.85	1.96	1.31	0.42	0.91

The underlying data for all countries except Honduras are from United Nations, Yearbook of National Accounts Statistics, 1958, New York, 1959 and for Honduras from ibid., 1957. The totals were added for the period; and percentage shares in the overall gross fixed capital formation and gross domestic product were computed.

The entries in Panel C, except for lines 48, 56, and 62, were derived by dividing the percentages in Panel A by the corresponding percentages in Panel B.

a. Forestry and fisheries were included in services in the distribution of fixed gross capital formation, but not apparently in the distribution of gross domestic product.

b. Construction was included with other services, and excluded from column 2, thus also affecting the shares in columns 4, 7, and 8.

c. Excluded from the average since data for national product are not available.

d. Construction was distributed among all other industries.

e. Excluded from the average since data for capital formation are not available.

f. The distribution of national product excludes income from dwellings.

Some of the differences in the industrial use structure of fixed capital formation among groups of countries in Panel A of Table 7 may be similar to the differences in the industrial origin structure of domestic product; others may not. The comparison is facilitated by calculating the percentage shares of the corresponding industry sectors in domestic product for the same countries and periods (Table 7, Panel B). It should be noted that the shares in gross domestic product are, for most countries, based on totals at factor cost, whereas the shares in fixed capital formation are based on totals at market prices. But this can hardly affect the broad conclusions.

Comparing Panels A and B, we find that the rise, observed as we move down the scale of per capita income, in the share of the A sector in fixed capital formation is similar to the rise in its share in gross domestic product. But this is the only similarity between the broad intergroup differences in Panels A and B. While the share of fixed capital formation going to the M+ sector is about the same for the broad groups of countries, the share of this sector in domestic product drops from 50 percent in Groups I and II to 23-1/2 percent in Groups VI and VII. Likewise, the decline in the share of fixed capital formation devoted to other services or to all services, observed as we move from Groups I and II to Groups VI and VII, is in contrast with the relative constancy of the shares of these sectors in domestic product.

Obviously, whatever the countrywide gross addition to fixed capital per unit of domestic product, it is different for different industrial sectors; and these intersectoral differences in the ratio of gross fixed capital formation to gross domestic product in turn differ among countries grouped by per capita income. Dividing the sectoral shares in Panel A by those in Panel B, we derive relatives of two ratios: the ratio of gross fixed capital formation to gross output in a given sector, and the ratio of gross fixed capital formation to gross output in the economy as a whole. A sector relative of less than 1 means that the share of fixed capital formation that this sector secures is smaller than the share it contributes to the gross domestic output of the country; if the relative is above 1, the sector secures a larger share of the country's fixed capital formation than it contributes to the country's domestic product. Panel C of Table 7 shows these relatives for each sector in each country, as well as two sets of means: one derived by averaging directly the relatives in Panel C, the other calculated from the arithmetic means in Panels A and B.

Since the underlying totals are in current rather than in constant prices, the relative price structure of capital and other goods differs among countries, and the distributions in Panels A and B are based on totals valued on different bases (market prices and factor costs, respectively), the specific values in Panel C cannot be assigned much weight. But the broad conclusions would not be changed radically by refinement to assure greater comparability.

First, in all groups of countries the A sector secured a lower share of fixed capital formation than it contributed to gross domestic product. But there are no significant differences among the broad groups of countries in this shortfall, i.e., in the extent to which the relative for the A sector falls below 1.

Second, in the high income countries, the share of the M sector proper in fixed capital formation is also lower than its share in gross domestic product. But as we descend on the scale of per capita income, the relative rises; and for

countries in Groups VI and VII the average share of this sector in fixed capital formation is distinctly larger than its share in gross domestic product. The relative for the transportation and communications sector follows the same pattern, except that it is well above 1 for all groups of countries. It rises from an average of 1.5 for Groups I and II to about 2.5 for Groups III, IV, and V, and to between 3.3 and 3.9 for Groups VI and VII. For the M+ sector, the relative rises from 0.9 for Groups I and II, to 1.9 for Groups VI and VII--meaning that in the developed countries its share in fixed capital formation is slightly below its share in domestic gross product, whereas in the low income countries its share in fixed capital formation is close to twice its share in gross domestic product.

Third, for the service sector as a whole (excluding transportation and communication) the relative is above 1 for Groups I and II, and Groups III, IV, and V--the effect of the large claims upon fixed capital formation in the form of dwellings. But it drops to 0.9 in Groups VI and VII--partly as a result of the decline in the relative claims of both dwellings and other services.

Setting aside errors of estimation, sampling, and averaging, the differences among the wide groups of countries shown in Panel C may reflect differences in the sectoral fixed capital-gross output ratios, or differences among the sectors in the rates of growth of gross output, or both. Let us assume, and the assumption is subject to serious qualifications both because of the character of the data in Table 7 and because of our scanty knowledge of the phenomena in question, that the necessary incremental gross fixed capital-gross output ratios for each sector are the same for the broad groups of countries distinguished in Panel C. Let us assume further that the average countrywide ratio of gross fixed capital formation to gross domestic product varies (as indicated in Table 1, line 2) from 21 percent in Groups I and II, to 16 percent in Groups III, IV, and V, to 14 percent in Groups VI and VII. Then, the average relative of 0.6 for the A sector in Panel C--which is about the same for the wide groups of countries--would mean that the ratio of gross fixed capital formation (i.e., the addition to gross fixed capital stock) to gross domestic output in the A sector would be 12.6 percent in Groups I and II (i.e., 21 x 0.6) and only 8.4 percent (i.e., 14 x 0.6) in Groups VI and VII. If, as assumed, the incremental gross fixed capital-output ratio for the A sector is the same for all countries, it follows that the rate of growth permitted by the fixed capital formation allocated to the A sector would be greater in Groups I and II than in Groups VI and VII--and by the ratio of 12.6 to 8.4. On the basis of similar calculations, the relatives in Panel C suggest a higher rate of growth in the gross output of both the M sector proper and the M+ sector in Groups VI and VII than in Groups I and II--because the relatives for the former exceed those for the latter by a higher ratio than that of 21 to 14. Finally, the relatives for the S sector as a whole (excluding transportation and communication) are much larger for Groups I and II than for Groups VI and VII, and on the assumptions stated, suggest a rate of growth in the gross product of the S sector twice as high in the high income countries as in the low income countries.

The validity of these inferences as to the rates of growth of the various sectoral products permitted by fixed capital formation in countries grouped by per capita income can be checked only by a test of the assumptions made concerning the capital-output ratios. Some related findings will be discussed in Section VI, but they will not be sufficient for meaningful conclusions. Consequently, the inferences are illustrative rather than substantive--especially since

secular relations between capital and output in the various sectors can hardly be derived over a period as short as the one covered in Table 7.

Before we deal with capital-output ratios directly, we review the scanty data on the industrial use structure of capital formation in the Communist countries (Table 8). Despite the varying definitions of sectors and of underlying national product, and any other numerous qualifications that can be legitimately adduced, the broad conclusions are clear. In general, the industrial use structure of capital formation in the Communist countries is similar to that of the low income non-Communist countries in Groups VI and VII. The share of capital formation going to agriculture (or the A sector more broadly defined to include forestry and fisheries) was, with one exception--the U. S. S. R. for 1955--much lower than the share of national product contributed by agriculture. The share of capital formation going to the M sector proper or to the M+ sector was also, with one exception--Poland--much larger than the share of either of these sectors in national product. Finally, the share of capital formation going to services was about the same as the share of that sector in national product (except in Poland where it was much larger). Since we have no knowledge of the incremental capital-output ratios for each sector, we cannot reach any conclusions concerning differences permitted by capital accumulation in the rate of growth of output among these several sectors (our inferences from Table 7, Panel C related to differences in the rate of growth of output of a given sector among countries grouped by per capita income, not to differences in rate of growth among sectors). But it is well-known, and indicated by some of the data in Table 8, that the rate of growth of the M or M+ sector was much greater than that of the A or the S sector; and clearly, the distinctive industrial use structure of capital formation in the Communist countries contributed to this result.

V. Incremental Capital-Output Ratios

If for a given period we relate additions to reproducible capital stock (i. e., capital formation) to additions to output, we presume an association between the two: the additions to output require the additions to reproducible capital stock, or the latter permit (not necessarily guaranteeing) the additions to output. This presumption can be invalidated for a variety of reasons that come easily to mind. Larger or smaller input of resources other than reproducible capital (natural resources, labor), technological changes, modifications in the productivity-determining social arrangements, changing reliance on foreign markets, can all affect the ratio of additions to reproducible capital to additions to output for a given country--the incremental capital-output ratio. Nevertheless, the association between reproducible capital and output may be sufficiently strong to warrant an interest in and examination of the ratio between the two.

The denominator of the ratio must reflect changes in 'real' product (output in constant prices), for we are not concerned with a rise in product due solely to a price rise. Nor can it be argued that this requirement is satisfied indirectly by the use of both capital formation and additions to product in current prices. To be sure, changing prices affect both but not necessarily to the same extent. Changes in product in current prices reflect price changes not only in the additions to output but also in the initial volume, whereas capital

Table 8.
Distribution of Capital Formation by Industrial Use Compared With Distribution of National Product by Industrial Origin, Selected Communist Countries

		Agriculture (1)	Industry (2)	Transportation & Communication (3)	M+ Sector (2) + (3) (4)	Services (5)
	U.S.S.R.					
	Share in National Product (%)					
1.	1928	42	28	7	35	23
2.	1955	28	40	9	49	23
3.	1937	36	34	7	41	22
4.	1948	28	36	8	44	28
5.	1953	23	46	10	56	21
6.	1955	27	37	5	42	31
	Share in Capital Formation (%)					
7.	1928/29-32	19	41	18.5	59.5	21.5
8.	1933-37	19	37	16.5	53.5	27.5
9.	1948	16	49.5	11	60.5	23.5
10.	1953	18	50	10	60	22
11.	1952-58	24	42	10	52	24
	Poland					
12.	Share in national income, 1952-53 (%)	21.3	50.7	9.3	60.0	18.7
13.	Share in gross fixed investment, 1950-55 (%)	10.0	49.8	12.2	62.0	28.0

	Mainland China					
	Share in National Product (%)					
14.	1952	47	n.a.	n.a.	14	39
15.	1957	41	n.a.	n.a.	24	35
	Share in Capital Formation (%)					
16.	1950-52	33	n.a.	n.a.	37	31
17.	1953-55	28	n.a.	n.a.	36	37
18.	1956-57	27	n.a.	n.a.	45	28

Lines 1 and 2: Soviet Econom Growth: A Comparison with the United States, Joint Economic Committee, Joint Committee Print, 85th Congress, 1st Session, Washington, 1957, Table 2, p. 133. Agriculture includes forestry and fisheries. Industry covers manufacturing, mining, and construction. Estimates are based on current price totals.

Lines 3-5: estimates by Herbert Block in Trends in Economic Growth: A Comparison of the Western Powers and the Soviet Bloc, Joint Committee on the Economic Report, Joint Committee Print, 83rd Congress, 2nd Session, Washington, 1955, Table X-1, p. 284. Industry includes forestry and fisheries, which are excluded from agriculture. Estimates are based on totals at 1937 factor prices.

Line 6: estimates by Morris Bornstein in Comparisons of the United States and Soviet Economies, Part II, Joint Economic Committee, Joint Committee Print, 86th Congress, 1st Session, Washington, 1959, Table 2, p. 383. Estimates are based on current price totals.

Lines 7 and 8: estimates by Norman M. Kaplan in Abram Bergson, ed., Soviet Economic Growth, Conditions and Perspectives, Evanston, 1953, Table 2. 7, p. 52. Estimates are based on current price totals.

Lines 9-10: from source cited for lines 3-5, Table X-6, p. 286. Estimates are based on current price totals.

Line 11: Alec Nove, Communist Economic Strategy: Soviet Growth and Capabilities, National Planning Association, Washington, 1959, Table 6, p. 20. Estimates are for fixed investment only.

Line 12: from source cited for lines 3-5, Table XI-1, pp. 287-8. Estimates are based on constant price totals.

Line 13: Alexander Erlich, "The Polish Economy after October 1956: Background and Outlook," American Economic Review, Papers and Proceedings, Vol. XLIX, No. 2, May 1959, Table 3, p. 112. Estimates are based on current price totals.

Lines 14-15: T. C. Liu, "Structural Changes in the Economy of the Chinese Mainland, 1933 to 1952-57," American Economic Review, Papers and Proceedings, Vol. XLIX, No. 2, May 1959, Table 1, p. 86. The modern non-agricultural sector, as defined by Dr. Liu, is here taken to represent the industries to which industrial capital formation should be related. Services are combined with handicraft manufacturing and old-fashioned transportation. Estimates are based on constant price totals.

Lines 16-18: Wilfred Malenbaum, "India and China: Contrasts in Development Performance," American Economic Review, Vol. XLIX, No. 3, June 1959, Table 4, p. 300. Estimates are based on current price totals.

formation in current prices reflect price changes only in the additions to capital stock. Hence a comparison of capital formation in current prices with changes in national product in current prices is misleading: the resulting incremental capital-output ratio is too low if prices are rising, and too high if prices are declining. The denominator is therefore the change in national product in constant prices expressed as an average percentage rise per year.

The numerator is the capital formation proportion over the interval covered by the change in national product. If the capital formation proportion is based on totals in current prices, the ratio indicates the percentage of national product in current prices that is diverted into capital formation to 'produce' the given percentage rise in 'real' national product. For example, if national product in constant prices grew 3 percent per year over a decade, and the average capital formation proportion in current prices during that decade was 15 percent, 5 percent of product in current prices was necessary to yield a rise of 1 percent per year in the product in constant prices. If, on the other hand, we relate the capital formation proportion in constant prices (say of the year 1950) to the annual percentage rate of growth in national product in the same 1950 prices, the ratio reveals the percentage of the national product in 1950 prices (of all goods) that had to be diverted into capital formation to produce a growth of 1 percent per year in national product in 1950 prices. The two percentages will be identical if the capital formation proportions based on totals in current and in constant prices are identical over the period under observation; and they will be, if the average price movements of goods entering capital formation and of those entering additions to national product are the same.[21]

Over long periods the two ratios are likely to differ significantly. However, for the short post-World War II period, the differences between them are so small that we can treat their group averages as interchangeable for the purposes of the present discussion. Table 9 demonstrates this conclusion and illustrates some introductory steps in the analysis that follows.

The table is limited by design to the twenty-three countries for which we have data on both gross domestic product and gross domestic capital formation proportions in current and constant prices. For each country we calculated the gross domestic capital formation proportion in current prices (group averages in line 2), the rate of increase per year in gross domestic product in constant prices (group averages in line 3), and the ratio of the capital formation

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21. The ratio of the capital formation proportion in constant prices to the annual rate of growth of national product in constant prices is a measure of the incremental capital-output ratio as usually understood. The ratio of the capital formation proportion in current prices to the rate of increase of product in current prices is also an incremental capital-output ratio--but one in which capital is valued at original changing cost and product is valued at changing current prices; and such a ratio is of little direct interest in the study of growth. The ratio of the capital formation proportion in current prices to the rate of increase of product in constant prices is in itself not a true incremental capital-output ratio; but it may serve as an approximation to it, given little divergence in movement between prices of capital goods and of all other goods.

Table 9.
Ratios of Gross Domestic Capital Formation Proportion in Current Prices to Rise in Gross Domestic Product in Constant Prices Compared With Ratios of the Former in Constant Prices to the Latter, Identical Countries Grouped by Per Capita Product, Post-World War II Years

	Groups of Countries by Per Capita Product							Wider Groups			
	I (1)	II (2)	III (3)	IV (4)	V (5)	VI (6)	VII (7)	I (8)	II & III (9)	IV & V (10)	VI & VII (11)
1. Number of countries	5	6	5	2	2	2	1	5	11	4	3
2. Proportion, gross domestic capital formation to gross domestic product, current prices (%)	19.3	22.9	17.2	18.8	13.8	13.1	29.-	19.3	20.3	16.3	18.4
3. Rise per year, gross domestic product, constant prices (%)	3.24	5.86	3.12	5.96	4.97	3.17	4.27	3.24	4.61	5.46	3.54
4. Ratio, gross domestic capital formation proportion, current prices, to rise per year, gross domestic product, constant prices	5.98	4.74	7.14	3.22	2.94	4.17	6.81	5.98	5.83	3.08	5.05
5. Alternative for line 4 (line 2 + line 3)	5.96	3.91	5.51	3.15	2.78	4.13	6.81	5.96	4.40	2.99	5.20

(Continued on next page)

Table 9 (Cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
6. Proportion, gross domestic capital formation to gross domestic product, constant prices (%)	18.7	22.9	17.6	18.7	13.2	14.4	32.6	18.7	20.5	16.0	20.5
7. Ratio, gross domestic capital formation proportion, constant prices, to rise per year, gross domestic product, constant prices	5.82	4.73	7.39	3.20	2.84	4.56	7.63	5.82	5.94	3.02	5.58
8. Alternative for line 7 (line 6 + line 3)	5.77	3.91	5.64	3.14	2.66	4.54	7.63	5.77	4.45	2.93	5.79

Lines 2-4 and 6 and 7 are unweighted arithmetic means of proportions or ratios for individual countries.
Line 2: from Appendix Table 1, column 4.
Line 3: from Appendix Table 3, column 1 (or column 2 where column 1 is not available).
Line 4: from Appendix Table 3, column 5.
Line 6: the underlying percentages were derived by the procedure used for Appendix Table 1, column 4 from the sources given in the notes to the latter.
Line 7: from Appendix Table 3, column 6.

proportion to the rate of growth of product (group averages in line 4). Then the calculations were repeated except that the capital formation proportions were based on totals in constant prices (lines 6 and 7).

In both sets of calculations, the capital formation proportions for 1951-57 were related to the rates of growth from 1951 to 1957. No allowance for lag of additions to output behind additions to capital was made; nor were the end years in the period covered by the capital formation proportions weighted by a half, to yield an average for the six-year span covered by the rate of increase. No proper lag can be established without detailed study and we doubt that it is large enough to affect significantly the results for a six or seven-year period. The additional refinement of weighting the capital formation proportions in the end years by half did not seem warranted--for it would have had but trifling effect on the group averages. These comments apply to the calculations not only in Table 9, but also in the tables that follow--unless otherwise qualified.

The ratios described above can be quite erratic. If the percentage rate of growth of product is low, the ratio will be high (and if the rate of growth is 0, the ratio will be infinity). If the percentage rate of growth of product is high, the ratio will be low, although still above 0, unless gross capital formation is negative--which is unlikely. Arithmetic means of such ratios, subject to high positive and limited negative errors naturally tend to be high; and some weighting of the ratios in computing the group averages is desirable. One obvious way of weighting is to calculate the average ratio for each group directly from the average rate of increase per year in output and the average gross capital formation proportion--as is done in lines 5 and 8. This is tantamount to weighting each ratio by the rate of increase underlying it, giving greater weight to the ratios when output increases more and less weight when output increases less. These weighted averages of the ratios of capital formation proportions to rates of increase in product are systematically lower than those in lines 4 and 7 (except in column 7, in which there is only one country, and in column 11, in which the small sample of three countries includes the single country in Group VII with a high ratio and a high rate of increase in product).

But the main finding of Table 9 for our purposes is the similarity between the average ratios based on capital formation proportions in current and in constant prices. The differences in the group averages, whether for the single Roman numeral groups or for the wider groups, are small and the patterns of movement of the two sets of ratios are practically identical. We can, therefore, assume for all analytical purposes that the two sets of ratios here would yield the same result; that they are interchangeable; and that they can be referred to as incremental capital-output ratios.

We can thus begin the analysis in Table 10 with the far larger number of countries for which we can relate capital formation proportions based on totals in current prices to rates of growth of product in constant prices. The procedure summarized in lines 2-5 parallels that for lines 2-5 of Table 9, but it relates to forty-four rather than twenty-three countries. The weighted averages of ratios are again consistently lower than the more erratic unweighted averages.

The calculation for all countries is paralleled by that for countries excluding politically and financially dependent units (lines 6-10). And here again the weighted means are consistently lower than the unweighted.

Table 10.
Ratios of Gross Domestic or National Capital Formation Proportion to Rise in Gross Domestic or National Product, Countries Grouped by Per Capita Product, Post-World War II Years

	Groups of Countries by Per Capita Product							Wider Groups			
	I (1)	II (2)	III (3)	IV (4)	V (5)	VI (6)	VII (7)	I (8)	II & III (9)	IV & V (10)	VI & VII (11)
A. Calculation A											
I All Countries											
1. Number of countries	7	7	6	7	6	8	3	7	13	13	11
2. Proportion, gross domestic capital formation to gross domestic product, current prices (%)	21.1	23.4	18.5	18.4	17.6	14.6	22.5	21.1	21.1	18.1	16.7
3. Rise per year, gross domestic product, constant prices (%)	2.93	5.52	4.02	5.68	8.34	5.10	4.45	2.93	4.83	6.91	4.92
4. Ratio, gross domestic capital formation proportion, current prices, to rise per year, gross domestic product, constant prices	8.09	5.13	6.44	3.28	2.35	3.41	5.42	8.09	5.73	2.85	3.96
5. Alternative for line 4 (line 2 + line 3)	7.20	4.24	4.60	3.24	2.11	2.86	5.06	7.20	4.37	2.62	3.39
II Countries Excluding Politically and Financially Dependent Units											
6. Number of countries	7	7	3	6	5	6	1	7	10	11	7
7. Proportion, gross domestic capital formation to gross domestic product, current prices (%)	21.1	23.4	17.2	18.7	17.8	14.6	19.1	21.1	21.5	18.3	15.2

8. Rise per year, gross domestic product, constant prices (%)	2.93	5.52	3.36	5.53	7.73	4.86	6.01	2.93	4.87	6.53	5.03
9. Ratio, gross domestic capital formation proportion, current prices, to rise per year, gross domestic product, constant prices	8.09	5.13	6.98	3.41	2.53	3.32	3.18	8.09	5.68	3.01	3.30
10. Alternative for line 9 (line 7 + line 8)	7.20	4.24	5.12	3.38	2.30	3.00	3.18	7.20	4.41	2.80	3.02
B. Calculation B											
11. Number of countries in line 12	8	7	6	11	6	10	8	8	13 (10)	17 (13)	18 (10)
12. Proportion, gross domestic capital formation to gross domestic product, current prices (%)	21.4	23.4	18.5	16.3	17.6	16.7	14.0	21.4	21.1 (21.5)	16.8 (17.6)	15.5 (14.0)
13. Number of countries in line 14	7	7	6	8	6	9	7	7	13	14	16
14. Rise per year, gross domestic product, constant prices (%)	2.93	5.52	4.10	5.51	8.41	5.58	3.45	2.93	4.87	6.75	4.65
15. Derived incremental ratio, gross domestic capital to gross domestic product (line 12 + line 14)	7.30	4.24	4.51	2.96	2.09	2.99	4.06	7.30	4.33 (4.41)	2.49 (2.61)	3.33 (3.01)
16. Proportion, gross capital formation to gross national product, current prices (%)	21.0	23.8	10.3	14.5	16.6	14.5	11.4	21.0	17.6 (21.4)	15.2 (16.7)	13.1 (13.0)

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Table 10 (Cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
17. Rise per year, gross national product, constant prices (%)	2.93	5.58	3.78	5.65	8.03	5.79	3.43	2.93	4.75	6.67	4.76
18. Derived incremental ratio, gross capital to gross national product (line 16 ÷ line 17)	7.17	4.27	2.72	2.57	2.07	2.50	3.32	7.17	3.71 (4.51)	2.28 (2.50)	2.75 (2.73)

Entries in parentheses are for countries excluding politically and financially dependent units (listed in the notes to Table 1). However, the various measures are not repeated for Group I, from which there are no exclusions.

Lines 2-4 and 7-9 are unweighted arithmetic means of proportions or ratios for individual countries.

Lines 2 and 7: from Appendix Table 1, column 4.

Lines 3 and 8: from Appendix Table 3, column 1 (or column 2 when column 1 is not given).

Lines 4 and 9: from Appendix Table 3, column 5.

Lines 11 and 12: from Table 1, lines 5 and 6 and 19 and 20.

Lines 14 and 17: based on Appendix Table 3, columns 1-4. Starting with the unweighted arithmetic mean of the percentage rise in the national product concept for which the largest number of countries is available, we estimated the average rise in the other concept by means of the relationship of the rise in the former to the rise in the latter for identical countries.

Line 16: from Table 1, lines 9 and 22.

Being much less affected by extremely large items than the unweighted arithmetic means, the weighted means of the ratios are the more acceptable estimates for our purposes. Moreover, such weighted means can be derived from the average capital formation proportions, calculated in the preceding tables, and the average rates of increase in national product, for a somewhat larger number of countries than are covered in lines 1-5. This is a matter of some importance because the small sample for Group VII yields unrepresentative averages and also affects the wider combined Groups VI and VII: the average capital formation proportion for three countries in Group VII is 22.5 percent (Table 10, line 2, column 7) whereas for 8 countries it is only 14.0 percent (Table 1, line 6, column 7). We are, therefore, likely to secure more tenable results if we combine capital formation proportions and rates of growth for the largest possible sample of countries. This derivation of the group averages of incremental capital-output ratios directly from the group averages of annual rates of growth of national product in constant prices and from the group averages of capital formation proportions based on totals in current prices (and assumed to be close to the proportions based on totals in constant prices) is designated calculation B, and its results are used in establishing the substantive findings.

In line 12 we have the average percentage proportions of gross domestic capital formation to gross domestic product, usually for 1951-57, for fifty-five countries. For the wider groups, we also show the average gross domestic capital formation proportions for countries excluding politically and financially dependent units (entries in parentheses, except for Group I where no countries are excluded).

In line 14 we have the group averages of the percentage rise per year in gross domestic product, usually from 1951 to 1957, for fifty countries--some of which are different from those covered in line 12. However, we are treating entries in line 12 as the best estimate now available of average gross domestic capital formation proportions in all non-Communist countries in Groups I - VII; or in all independent countries in the averages for the wider groups. We are treating the entries in line 14 as the best estimates now available of average rates of growth per year in gross domestic product in constant prices of all non-Communist countries in Groups I - VII. Furthermore, a test calculation for rates of growth of gross domestic product, comparing the averages for the wider groups including and excluding politically and financially dependent units, revealed no significant differences between the averages for the more inclusive and less inclusive samples. We are, therefore, treating the entries in line 14, columns 8-11 as representative also of average rates of growth of gross domestic product in countries excluding the politically and financially dependent units. And this means that, at least for the non-Communist countries, the derived averages of incremental gross domestic capital-gross domestic output ratios in line 15, are, with the present data, the best estimates for the period under observation.

These ratios form an intriguing pattern for countries grouped by per capita income--a pattern which, for all countries, is similar to that in line 5, except for Group VII. The ratio is highest for Group I--over 7, meaning that over seven percentage units of the gross domestic capital formation proportion are associated with one percentage unit of growth of gross domestic product. It then declines markedly, and for the sample of all countries, reaches a trough

of 2.1 in Group V, to rise again to 4.1 in Group VII. In the wider groups for all countries, the ratio drops from a high of 7.3 for Group I to a low of 2.5 for Groups IV and V, and rises to 3.3 for Groups VI and VII, still less than half of that for Group I. For countries excluding those politically and financially dependent, the ratio declines from 7.3 to a low of 2.6 for Groups IV and V, and then rises to only 3.0 for Groups VI and VII. In short, the incremental gross domestic capital-output ratios are distinctly lower in the low income, less developed countries--a rise of 1 percent of output in the latter requiring (or being associated with) fewer percentage units of the gross domestic capital formation proportion.

By means of calculation B we also derived the group averages of incremental ratios of gross national capital to gross national product (i.e., of gross national capital formation proportions related to additions to gross national product). The necessary components--averages of gross national capital formation proportions (from Table 1) and of percentage rates of growth of gross national product per year are given in lines 16 and 17, and the derived incremental gross capital-gross national product ratios appear in line 18.

The pattern of these ratios for countries grouped by per capita product is not too different from that shown for the domestic capital-output ratios in line 15. Because of the high proportions of capital imports to gross domestic capital formation in Groups III, VI, and VII (for the sample of all countries), the averages of their capital-output ratios are most markedly reduced when we shift from domestic to national ratios. But for the wider groups for all countries, the incremental gross national capital-output ratio is still above 7 for Group I, drops to 2.3 for Groups IV and V, and rises to 2.8 for Groups VI and VII, well below half of that for Group I. If we exclude politically and financially dependent countries, the range in the national capital-output ratio is slightly wider: it drops from 7.2 for Group I to 2.5 for Groups IV and V, and 2.7 for Groups VI and VII, not much above a third of the ratio for Group I. The association of a one percent rise in output with a smaller number of percentages of the national capital formation proportion in the low income countries than in the high income countries is even more conspicuous than it is for the domestic capital-output ratios.

Before we elaborate upon the pattern of the incremental capital-output ratios found in Table 10, it is desirable to check upon its validity in two ways. First, the percentage rates of increase in gross domestic or national product were derived from comparisons of values for single years, 1951 and 1957; and these may have been affected by transient factors in different ways for the more developed and the less developed countries. It is, therefore, of interest to see whether the findings are changed if we recalculate the rates of increase in gross domestic product, using three-year averages rather than single years for terminal values. Also, we take the opportunity of introducing the additional refinement of weighting by half the terminal year values underlying the capital formation proportions.

The comparison uses calculation A and the estimates refer to gross domestic capital formation and gross domestic product (Table 11). Because the necessary data for some countries are lacking, only thirty-six are included in the new calculation. But even for the smaller number of countries the pattern is the same as that observed in Table 10 (lines 9 and 10). The weighted average

Table 11.
Comparison of Incremental Gross Domestic Capital-Output Ratios in Table 10 With Those Based on Three-Year Averages for Terminal Values of Gross Domestic Product, Calculation A, Countries Grouped by Per Capita Product

		Wider Groups of Countries by Per Capita Product			
		I	II & III	IV & V	VI & VII
		(1)	(2)	(3)	(4)
A.	All Countries				
	Number				
1.	Table 10, line 1	7	13	13	11
2.	New	7	13	9	7
	Proportion, Gross Domestic Capital Formation to Gross Domestic Product, Current Prices (%)				
3.	Table 10, line 2	21.1	21.1	18.1	16.7
4.	New	20.8	20.5	18.5	15.6
	Rise per Year, Gross Domestic Product, Constant Prices (%)				
5.	Table 10, line 3	2.93	4.83	6.91	4.92
6.	New	3.06	4.99	6.32	4.68
	Ratio, Gross Domestic Capital Formation Proportion, Current Prices, to Rise in Gross Domestic Product, Constant Prices				
7.	Table 10, line 4	6.09	5.73	2.85	3.96
8.	New	7.98	5.33	2.97	3.68
	Alternative Incremental Gross Domestic Capital-Output Ratio				
9.	Table 10, line 5	7.20	4.37	2.62	3.39
10.	New (line 4 + line 6)	6.80	4.11	2.93	3.33
B.	Countries Excluding Politically and Financially Dependent Units Alternative Incremental Gross Domestic Capital-Output Ratio				
11.	Table 10, line 10	7.20	4.41	2.80	3.02
12.	New	6.80	4.23	3.04	2.77

Lines 2, 4, 6, 8, 10, and 12: the general procedure is that followed in Table 10, calculation A. Here, however, the capital formation proportion is based on cumulated totals for 1951-56 with the terminal years given half weight; and the rise per year in gross product is calculated from the averages for 1950-52, centered on 1951, and 1955-57, centered on 1956.

For lack of data, the following countries included in Table 10 had to be excluded here: Mexico (Group IV); Iraq, Jamaica, and Portugal (Group V); Egypt, Peru, and Taiwan (Group VI); Morocco (Group VII). For the list of politically and financially dependent countries, see the notes to Table 1.

The underlying estimates are from United Nations, Yearbook of National Accounts Statistics, 1958 and 1957. Where gross product in constant prices was not given it was estimated by deflating the current price value by the cost of living index given in the United Nations, Statistical Yearbook, 1958.

of the incremental gross capital-output ratios for all countries declines from Group I to a low in Groups IV and V and rises again in Groups VI and VII; and the ratio for Groups VI and VII is still less than half of that for Group I. With the exclusion of the politically and financially dependent units, the pattern becomes even more systematic: in the new calculation, the incremental gross capital-output ratio declines steadily from 6.8 in Group I to 2.8 in Groups VI and VII (line 12).

Second, it may be asked to what extent the findings in Table 10 are a result of an accidental combination of circumstances in the six- to seven-year period under observation. If we subdivide the post-World War II period into two, and calculate the capital-output ratios for each subperiod separately, will the pattern of differences among groups of countries classified by per capita income, observed in Table 10, remain?

A tentative answer to this question is provided in Table 12, which is limited to 23 countries, a much smaller sample than that in Table 10. Here we calculate the incremental capital-output ratio for two three-year intervals separately, using three-year averages of gross domestic product to compute the rate of increase per year in the latter. In each three-year period we have the same decline from high capital-output ratios for Group I to the lowest in either Groups IV and V or Groups VI and VII; and the ratio for the low income countries is less than half that for the high income countries (lines 7 and 8). The tests in Tables 11 and 12 thus support the association between the incremental gross capital-output ratios and the grouping of countries by per capita income found in Table 10--at least for the post-World War II decade.

Despite the difficulties of estimating capital depreciation and consumption, analytically the net capital-output ratios are of more interest than the gross: for additions to, not replacement of, capital stock presumably have the most direct bearing upon net additions to product. In the incremental gross capital-output ratio there is an identical element of capital consumption in both the numerator and the denominator on a countrywide basis; and it imparts a degree of constancy to the ratio that may damp differences in space and variations over time and obscure the analysis of effects of capital formation on changes in net output.

In Table 13 we use calculation B, combining the net capital formation proportions from Table 4 with average rates of rise per year in net product--for countries grouped by per capita income, and for the wider groups using both the sample of all countries and that of countries excluding politically and financially dependent units. It must be remembered that the net capital formation proportions in Table 4 were themselves derived--from a combination of capital consumption ratios available for a smaller number of countries with gross capital formation proportions for an appreciably larger number. To these we now add further steps in the sequence of derivation to obtain the results of most interest to us, those in lines 5 and 8. But the broad pattern that emerges is unlikely to be affected by errors of estimation. If we concentrate on the wider groups, the results can be briefly summarized.

First, although Group I for all countries has the highest net domestic capital formation proportion, the rate of growth of its net domestic product is lowest, and consequently its incremental net domestic capital-output ratio, 5.3,

Table 12.
Incremental Gross Domestic Capital-Output Ratios for Two Periods, 1950-1953 and 1953-1956, Calculation A, Countries Grouped by Per Capita Product

		Wider Groups of Countries by Per Capita Product			
		I	II & III	IV & V	VI & VII
	Number of Countries	(1)	(2)	(3)	(4)
1.	1950-53	7	9	4	3
2.	1953-56	7	9	4	3
	Proportion, Gross Domestic Capital Formation to Gross Domestic Product, Current Prices (%)				
3.	1950-53	20.9	20.3	16.4	11.6
4.	1953-56	21.0	20.6	16.3	13.2
	Rise per Year, Gross Domestic Product, Constant Prices (%)				
5.	1950-53	2.56	4.57	6.32	6.97
6.	1953-56	3.70	4.31	6.74	5.09
	Incremental Gross Domestic Capital-Output Ratio				
7.	1950-53 (line 3 ÷ line 5)	8.16	4.44	2.59	1.66
8.	1953-56 (line 4 ÷ line 6)	5.68	4.78	2.42	2.59

The general procedure is that followed in Table 10, calculation A. Here, however, the capital formation proportion is based on cumulated totals for 1950-53 and 1953-56 with the terminal years given half weight; and the rise per year in gross product is calculated between the averages for 1949-51, centered on 1950, and 1952-54, centered on 1953, and between the latter and the averages for 1955-57, centered on 1956.

The coverage here for Group I is the same as in Table 10; for Group II excludes Venezuela; for Group III is Austria, Chile, and Ireland; for Groups IV and V is Colombia, Greece, Guatemala, and Japan; for Groups VI and VII is Ceylon, Philippines, and Burma.

The underlying estimates are from United Nations, Yearbook of National Accounts Statistics, 1958, extrapolated when necessary by estimates in ibid., 1957; and extrapolated further by estimates in the United Nations, Statistical Papers, Series H, No. 9. Where gross product in constant prices was not given it was estimated by deflating the current price value by the cost of living index in the United Nations, Statistical Yearbook, 1958.

Table 13.
Ratios of Net Domestic or National Capital Formation Proportion to Rise in Net Domestic or National Product, Countries Grouped by Per Capita Product, Post-World War II Years

	Groups of Countries by Per Capita Product							Wider Groups			
	I	II	III	IV	V	VI	VII	I	II & III	IV & V	VI & VII
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1. Number of countries in line 2	8	7	6	11	6	10	8	8	13 (10)	17 (13)	18 (10)
2. Proportion, net domestic capital formation to net domestic product, current prices (%)	13.8	15.6	11.7	11.2	13.0	10.4	10.5	13.8	13.7 (14.0)	11.9 (12.5)	10.3 (9.2)
3. Number of countries in line 4	7	7	6	8	6	9	7	7	13	14	16
4. Rise per year, net domestic product, constant prices (%)	2.62	5.45	3.96	5.40	8.21	5.49	3.16	2.62	4.76	6.61	4.47
5. Derived incremental ratio, net domestic capital to net domestic product (line 2 ÷ line 4)	5.27	2.86	2.95	2.07	1.58	1.89	3.32	5.27	2.88 (2.95)	1.80 (1.89)	2.30 (2.06)
6. Proportion, net capital formation to net national product, current prices (%)	13.5	15.9	3.3	9.5	11.7	8.1	7.3	13.5	9.7 (13.7)	10.2 (11.4)	7.5 (8.1)
7. Rise per year, net national product, constant prices (%)	2.61	5.52	3.62	5.53	7.82	5.53	3.16	2.61	4.64	6.51	4.49
8. Derived incremental ratio, net capital to net national product (line 6 ÷ line 7)	5.17	2.88	0.91	1.72	1.50	1.46	2.31	5.17	2.09 (2.95)	1.57 (1.75)	1.67 (1.80)

Notes on next page

is highest (lines 2, 4, and 5). The same is true for the net national capital formation proportion and the net national capital-output ratio (lines 6 and 8).

Second, the net capital-output ratio, for all countries and for domestic capital, drops to a low of 1.8 for Groups IV and V, the groups with the highest rate of growth in net domestic or national product. Then, again for all countries and domestic net capital, the ratio rises to 2.3 for Groups VI and VII, well below half of the ratio for Group I. For the net national capital-output ratio, the decline for all countries is from 5.2 for Group I to 1.6 for Groups IV and V and 1.7 for Groups VI and VII, about a third of the ratio for Group I.

Third, if we exclude the politically and financially dependent units, the range from the high capital-output ratio for Group I, and even Groups II and III, to the low ratios for Groups IV and V, and VI and VII, is about the same. For this smaller sample of countries, the net domestic ratio is 1.9 and 2.1 in the low income countries, compared with 5.3 and 2.9 in Groups I and II and III; the net national capital-output ratios are 1.8 and 1.8, compared with 5.2 and 3.0.

The data on incremental capital-output ratios for the Communist countries, which we ought to consider before discussing some of the questions raised by the findings in Tables 10 and 13, are scarce, relate only to net ratios, and are subject to even more qualifications than the data for the non-Communist countries. Based on the official data in the United Nations, Yearbook of National Accounts Statistics, 1958, the ratio for Mainland China for 1952-56 (taking half of capital accumulation in the terminal years) is 2.3; for Poland for 1951-57 it is 2.4; for Bulgaria for 1952-57 it is 2.4; and only for Hungary, where I averaged the index of net material product for 1951 and 1952 at one end and for 1956 and 1957 at the other end (to remove the effect of annual variations), and related to it capital accumulation for the years 1952-56, is the ratio, 6.4, exceptionally high. It may be assumed that for the U.S.S.R. over periods not marked by any major disturbances, the net capital-output ratio would also be in the neighborhood of 2.0, a level suggested by a net capital formation proportion of 15 percent and a rate of growth of net national product of between 6 and 8 percent per year. If these few scraps of data can be trusted, the net capital-output ratios for the Communist countries are well within the range shown in Table 13, although they must be, generally, much lower than the ratios for Group I.

Notes to Table 13

Entries in parentheses are for countries excluding politically and financially dependent units (listed in the notes to Table 1). However, the various measures are not repeated for Group I, from which there are no exclusions.

Lines 1 and 2: from Table 4, lines 9 or 19 and 12 or 22.
Lines 3, 4, and 7: see notes to Table 10, lines 14 and 17.
Line 6: from Table 4, line 18 or 28.

VI. Industrial Structure and the Capital-Output Ratios

The international differences in the incremental capital-output ratio suggested in Tables 10 and 13 are subject to sizeable statistical errors, which cannot be tested by recalculations of the kind summarized in Tables 11 and 12. The errors in the capital formation proportions for the low income countries due to undercoverage may be so large that correction for them would substantially raise both the proportions and the incremental capital-output ratios. On the other hand, it must be remembered that producers' equipment is valued at appreciably higher relative prices in the underdeveloped countries, and the corresponding adjustment would lower the capital formation proportions in these countries and thus lower their incremental capital-output ratios. At any rate, the statistical errors involved are hardly so substantial as to reduce to insignificance the contrast between the capital-output ratios for Groups I and II and III (which, on a net basis, are 5.2 and 2.1 or 3.0, respectively) and those for the combined Groups VI and VII (which are between 1.7 and 1.8).

If we accept the differences suggested in Tables 10 and 13, a question may be raised as to the significance of this finding--based on observation of a seven-year period--for longer-term movements. Even if we assume that the differences would persist if the period were extended to a decade, their relevance to long-term analysis would not be strengthened appreciably--if incremental capital-output ratios can change materially from one decade to the next. Besides, as we have frequently stressed, inferences from cross-section analysis as to the common pattern of long-term movements within individual countries must be carefully checked. Therefore we make no claim that the international differences suggested for the recent period have a direct bearing on the long-term movement of the average or incremental capital-output ratio in the economic growth of a country.

Nevertheless, it is of interest to explore these international differences in possible relation to the structure of capital formation and of the increase in output. Different types of capital goods are characterized by different ratios to their yield (i.e., their output). For example, we know that, in general, construction results in long-lived capital goods, for which the ratio of current capital formation to additions to output must be high--at least in comparison with producers' equipment which has a much shorter economic life and a lower ratio of gross additions to stock to current additions to output. Could the higher incremental capital-output ratios for Groups I and II be due to a share of construction in their gross capital formation that is much higher than the share in countries with low per capita income?

If Table 6 has any validity this hypothesis is not tenable: the incremental gross domestic capital-output ratio for Group I is 7.3 and for Groups VI and VII it is 3.3 (Table 10, line 15, columns 8 and 11); whereas the share of construction in gross domestic capital formation for Group I is 55.5 percent and for Groups VI and VII it is 54.6 percent (Table 6, line 6, columns 1 and 4). Even if we allow for differences between dwellings and other construction and assume incremental capital-output ratios of say 15 for dwellings, 10 for other construction, 2 for producers' equipment, and 0.5 for stock accumulation, the derived incremental capital-output ratio (using the percentages in Table 6) would work out to 7.4 for Group I and 7.2 for Groups VI and VII. It is clear that differences in the distribution of capital formation among construction, equipment, and

inventory accumulation do not account for a significant part of the differences in the incremental capital-output ratio for the groups distinguished in Tables 10 and 13.

We next consider the structure of capital formation by industrial use, compared with the structure of additions to the country's product by industrial origin. We know that the capital-output ratios for the industrial sectors of an economy differ widely; and differences among countries in their over-all incremental capital-output ratios may be traced to differences in these sectoral ratios as well as to the differing weights of the sectors in the addition to the country's total product. To deal with this question adequately, we need data on movements in both domestic (or national) product and in the product originating in each industrial sector--all in constant prices. In addition, we need data on the distribution of capital formation among the same industrial sectors, the distribution among sector-users. The latter distribution may be based on totals in either current or constant prices, and the resultant two sets of sectoral ratios of the capital formation proportion to the rise in product are comparable to the two sets of countrywide ratios shown in Table 9.

Unfortunately, data are available for only seven countries on the additions to product in constant prices by major sectors and on the distributions of gross fixed capital formation among the same major sectors in both constant and current prices. The purpose of Table 14, which is based on these data, is to ascertain if the incremental ratios of gross fixed capital to gross domestic product (total and sectoral) are the same whether the fixed capital formation proportions are based on constant or current price values. The procedure is parallel to that employed in Table 9 but the number of countries is much smaller and the analysis for each country as a whole is supplemented by the analysis of four major sectors. While there are some differences between the results based on current and constant price fixed capital formation proportions, two findings stand out clearly. First, the incremental capital-output ratios derived from current price capital formation proportions are quite close to those derived from constant price proportions--and the two can be used interchangeably. Second, because the sample is small and because averages of the incremental capital-output ratios calculated separately for each country can be erratic, the weighted averages of such ratios in lines 6 and 7 and 13 and 14 are preferable to the unweighted averages in lines 4 and 5 and 11 and 12.

If then we can use the gross fixed capital formation proportions based on current prices totals, it becomes possible to assemble data for ten countries (Table 15). This is still a limited sample; and its range is mostly from Group II to Group VI (there is only one country in Group I and none in Group VII). Yet, small as the sample is, the movement of the incremental countrywide gross fixed capital-output ratios here--from 6.3 in Groups I and II, to 2.9 in Groups III and IV, and 3.4 in Groups V and VI (line 12)--is quite similar to that shown for the larger sample of countries in Table 10 (which averages out at 5.8 for Groups I and II, 3.7 for Groups III and IV, and 2.5 for Groups V and VI, see line 15). More important, the differences among the three groups of countries with respect to their incremental gross fixed capital-output ratios are quite wide--almost as wide as those based on the larger sample in Table 10. We can, therefore, study the disparities in sectoral structure to see whether they explain the large differences in the countrywide capital-output ratios.

Table 14.
Ratios of Gross Fixed Capital Formation Proportion, Current and Constant Prices, to Rise in Gross Domestic Product, Constant Prices, by Major Sectors, Identical Countries, Post-World War II Years

	A Sector (1)	M Sector (2)	Transport. & Communication (3)	Service Sector (4)	Total (5)
A. High Income Countries (3)					
1. Rise per year, gross domestic product, constant prices (%)	1.33	3.89	4.47	2.04	3.00
Proportion, Gross Fixed Capital Formation To Gross Domestic Product (%)					
2. Based on constant price totals	12.4	13.9	39.5	23.8	20.2
3. Based on current price totals	12.7	14.2	36.0	24.3	20.3
Ratio, Gross Fixed Capital Formation Proportion to Rise in Gross Domestic Product					
4. Based on constant price proportion	16.2	3.5	8.6	11.5	6.7
5. Based on current price proportion	16.4	3.6	8.1	11.7	6.8
Alternative Ratio					
6. Line 2 ÷ line 1	9.3	3.6	8.8	11.7	6.7
7. Line 3 ÷ line 1	9.5	3.7	8.1	11.9	6.8
B. Low Income Countries (4)					
8. Rise per year, gross domestic product, constant prices (%)	3.79	7.81	5.50	4.90	5.80
Proportion, Gross Fixed Capital Formation to Gross Domestic Product (%)					
9. Based on constant price totals	9.7	14.0	50.0	37.6	17.3
10. Based on current price totals	10.1	14.0	48.1	37.7	17.3
Ratio, Gross Fixed Capital Formation Proportion to Rise in Gross Domestic Product					
11. Based on constant price proportion	3.3	1.8	9.3	7.2	3.0
12. Based on current price proportion	3.4	1.8	9.0	7.2	3.0
Alternative Ratio					
13. Line 9 ÷ line 8	2.6	1.8	9.1	7.7	3.0
14. Line 10 ÷ line 8	2.7	1.8	8.7	7.7	3.0

(Notes on next page)

Both the countrywide incremental capital-output ratios and the capital-output ratios for most sectors differ among the three groups of countries (lines 12-16). For the A sector, the average ratio is more than 10 in Groups I and II and less than 3 in the other two groups: and similarly large differences in the sectoral ratios among the three groups of countries are indicated for the M and S sectors. Only in the case of transportation and communication are the average sectoral ratios within a fairly narrow range.

This being the case, the differences in the weight of the sectors in total additions to domestic product could not have much effect on the intergroup differences in the countrywide capital-output ratio. In fact, the differences among groups of countries in the shares of the various sectors in additions to gross domestic product are not large (lines 17-21). The share of the M sector varies from 46 to 54 percent; that of the S sector is about the same in all three groups.

The entries in lines 22 and 23 summarize the results effectively. If differences in the sectoral structure of additions to product were an important factor affecting intercountry differences in the incremental capital-output ratio, use of the average sectoral capital-output ratios in lines 13-16, column 4, with allowance for the different weights of sectors in lines 17-20, columns 1-3, would have resulted in a movement of the capital-output ratio similar to that observed in line 12. But no such movement is found in line 22: the countrywide capital-output ratios are quite similar in the three groups of countries. However, if we allow the sectoral capital-output ratios to differ (using lines 13-16, columns 1-3) and weight them by an identical set of sector shares (lines 17-20, column 4), the intergroup differences in the countrywide capital-output ratios emerge in almost full force (line 23 compared with line 12).

The small sample in Table 15 may have yielded unrepresented averages of sectoral fixed capital-output ratios and of sectoral additions to gross domestic product. We have no data with which to check the former, but we can test the sector weights in lines 17-21: for twenty-three countries for recent post-World War II years, estimates of gross domestic product in constant prices, by sectors, are available. For these countries we calculated the

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Notes to Table 14

Lines 1-3 and 8-10: unweighted arithmetic means of rates and proportions for identical individual countries given in Appendix Table 4.

Lines 4 and 11: unweighted arithmetic means of ratios for individual countries of the gross fixed capital formation proportions, given in Appendix Table 4, lines 11-17, to the rate of growth in gross domestic product, given in ibid., lines 1-10 (for identical countries).

Lines 5 and 12: unweighted arithmetic means of ratios for individual countries of the gross fixed capital formation proportion, given in Appendix Table 4, lines 18-27, to the rate of growth in gross domestic product, given in ibid., lines 1-10, for the countries with capital formation proportions based on constant price values.

Table 15.
Ratios of Gross Fixed Capital Formation Proportion to Rise in Gross Domestic Product, by Major Sectors, Countries Grouped by Per Capita Product, Post-World War II Years

		Wider Groups of Countries by Per Capita Product			
		I & II (1)	III & IV (2)	V & VI (3)	All Countries (4)
1.	Number of Countries	4	3	3	10
	Rise per Year, Gross Domestic Product, Constant Prices (%)				
2.	Total	3.45	6.34	3.95	4.46
3.	A sector	1.18	4.07	2.74	2.52
4.	M sector	4.77	8.45	5.70	6.15
5.	T + C sector	4.73	5.93	4.66	5.07
6.	Service sector	2.58	5.47	3.83	3.82
	Proportion, Gross Fixed Capital Formation to Gross Domestic Product, Current Prices (%)				
7.	Total	21.7	18.4	13.4	18.2
8.	A sector	13.0	11.5	7.9	11.0
9.	M sector	15.4	14.4	13.7	14.6
10.	T + C sector	33.2	48.4	38.7	39.4
11.	Service sector	30.1	43.8	16.1	30.0
	Ratio, Gross Fixed Capital Formation Proportion to Rise in Gross Domestic Product				
12.	Total (line 7 + line 2)	6.3	2.9	3.4	4.1
13.	A sector (line 8 + line 3)	11.0	2.8	2.9	4.4
14.	M sector (line 9 + line 4)	3.2	1.7	2.4	2.4
15.	T + C sector (line 10 + line 5)	7.0	8.2	8.3	7.8
16.	Service sector (line 11 + line 6)	11.7	8.0	4.2	7.9
	Share in Total Additions to Gross Domestic Product, Constant Prices (%)				
17.	A sector	6.1	17.7	18.6	13.4
18.	M sector	54.2	50.9	45.6	50.7
19.	T + C sector	14.6	5.6	10.6	10.7
20.	Service sector	25.0	25.7	25.2	25.3
21.	Of which dwellings	2.6(3)	4.2(2)	7.9	5.0
22.	Ratio on assumption of weights in lines 17-20, columns 1-3, and ratios in lines 13-16, column 4	4.68	4.47	4.73	
23.	Ratio on assumption of ratios in lines 13-16, columns 1-3, and weights in lines 17-20, column 4	6.80	4.14	3.56	

Unless otherwise indicated entries are unweighted arithmetic means of measures for individual countries.
Lines 2-6: from Appendix Table 4, lines 1-10.
Lines 7-11: from Appendix Table 4, lines 18-27.
Lines 17-21: the underlying absolutes for individual countries are those used in deriving the annual rate of growth described in the notes to Appendix Table 4, lines 1-10. Line 21, column 1 is available for only 3 of the 4 countries; and column 2 for 2 of the 3 countries.

average weight of each major sector (and of some subsectors) in addition to gross domestic product from 1951 to 1957 (Table 16).

The intergroup differences in the shares of the major sectors in additions to gross domestic product in Table 16 (lines 2-5) are different from those in Table 15 (lines 17-20). Here in the low income countries not only is the share of the A sector higher, but that of the M sector is distinctly lower. Also, the share of the S sector is higher in Groups III and IV than in Groups I and II; and highest in Groups V, VI, and VII. This higher share of the S sector in additions to domestic product in the low income countries is due mainly to the larger shares of trade and finance (line 8) and of public administration (line 10). This may explain the difference in the incremental fixed capital-output ratio for the S sector in Table 15 (line 16): the much lower ratio for Groups V and VI than for Groups I and II may in part be due to the larger share of trade and public administration in the additions to gross domestic product contributed by the S sector.

But this is merely conjecture. The main point here is that the sectoral shares in Table 16 do not help to explain the intergroup differences in countrywide incremental ratios of gross fixed capital to domestic output, if we still accept the sectoral capital-output ratios of Table 15--for which we have no better substitute at present. If we use the new sector shares in Table 16 as weights, and recalculate the averages in line 22 of Table 15--i.e., hold sectoral capital-output ratios constant (at the levels shown in Table 15, lines 13-16, column 4), the derived averages of countrywide incremental ratios of gross fixed capital to gross domestic product become 4.7 for Groups I and II, 5.2 for Groups III and IV, and 5.5 for Groups V and VI. The result thus is the opposite of what we found in Table 15 (line 12, columns 1-3); a rise rather than a decline in the capital-output ratio, as we move from the high to the low income countries. If we use a new fixed set of sector shares as weights (the average for all countries in Table 16) and allow the sectoral capital-output ratios to differ (as they do in Table 15, lines 13-16, columns 1-3)--thus recalculating line 23 of Table 15--the derived countrywide fixed capital-domestic product ratios are 7.9 for Groups I and II, 4.6 for Groups III and IV, and 3.6 for Groups V and VI. The sectoral differences in capital-output ratios thus more than account for the intergroup differences in countrywide capital-output ratios.

In short, on the basis of the available evidence, differences in overall capital-output ratios among countries in recent years have been associated with substantial differences in sectoral capital-output ratios. Hence, the assumption made in our discussion of Table 7 above--that the sectoral capital-output ratios are the same for all groups of countries classified by per capita income--is contradicted by the data in Table 15--particularly for the A, M, and S sectors.

It may well be that the results suggested by Table 15 would be substantially modified with more extensive coverage. Offhand, one would expect that the incremental capital-output ratio for the M+ sector would differ less among countries at different levels of per capita income and development than those for the A and S sectors. The M+ sector, growing within an economy in recent times, requires capital equipment prescribed by prevailing modern technology: it is the modern sector, whether in a developed or underdeveloped economy; and, provided the industry-mixes are similar, the capital-output ratios should not differ materially. In the case of agriculture, the same additions to gross

Table 16.
Shares of Industrial Sectors in the Rise in Gross Domestic Product, Countries Grouped by Per Capita Product, 1951 to 1957 (Based on constant price totals)

	Wider Groups of Countries by Per Capita Product		
	I & II	III & IV	V, VI, & VII
	(1)	(2)	(3)
1. Number of countries	6	7	10
Sector Shares (%)			
2. A sector	7.0	18.5	25.8
3. M sector	53.9	37.4	28.4 (8)
4. T + C sector	12.2	8.5	6.8 (7)
5. Service sector	26.9	35.7	40.8 (7)
6. Mining, manufacturing, electric, gas, & water	46.2	34.6 (6)	23.6 (7)
7. Construction	7.8	4.6 (6)	3.9 (6)
8. Trade & finance	14.2	13.6	17.8 (8)
9. Dwellings	3.1	7.2 (6)	4.9 (6)
10. Public administration & defense	3.9	7.6 (6)	13.5 (8)
11. Other services	5.7	6.4 (6)	7.0 (7)

Entries are unweighted arithmetic means of percentages for individual countries given in Appendix Table 5.
Figures in parentheses are the number of countries covered, when different from the number in line 1.

output in countries differing widely in the level of development, can probably be secured with different amounts of additional capital; and this may be true of the rather heterogeneous S sector, even if we assign little weight to the effect of dwellings on the incremental capital-output ratio. A larger sample might show greater similarity among groups of countries classified by per capita income in their incremental capital-output ratios for the M and M+ sectors, and greater differences in the ratios for the A and S sectors. But these suggestions are only plausible guesses that cannot be tested with the data currently available.

Before concluding the discussion of the evidence on the recent levels of incremental capital-output ratios, we may ask whether the generally lower level of these ratios for the low income countries shown in Tables 10 and 13 are likely to have been true over the long run. That, by and large, the incremental reproducible capital-output ratios may have been, in the long run, lower for the less developed, low income countries than for the high income countries, is suggested by the somewhat lower average capital-output ratios in the former in past years. In 1894-95 the six countries with the lowest per capita income had a ratio of reproducible wealth to income of 2.6 (presumably domestic wealth ratios), compared with 2.9 for the five countries with the highest per capita income (or 3.3, if capital investments abroad for the United Kingdom and France

are included).[22] In 1913-14, the average ratio ranged from 1.3 for the eight countries with higher per capita income to 3.5 for the nine countries with lower per capita income.[23] In a more recent comparison, the domestic reproducible capital-output ratios for the three countries with low per capita income (India, Japan, and Mexico) were all below 2.5, whereas the ratios for twelve other countries were higher (excluding West Germany, for which capital was related to gross rather than net product).[24] But an average capital-output ratio is a cumulation of past incremental capital-output ratios; and if the average ratios of one group of countries are lower than those of another, the implication is that the corresponding incremental ratios must also have been lower in the long period over which national wealth is accumulated.

In this sense, viz., that in general in recent years the incremental capital-output ratios were lower in the low income, less developed countries, the findings of Tables 10 and 13 are not inconsistent with the scanty data on the average reproducible capital-output ratios in the past. But for the magnitude of the differences in these ratios (Table 13 is particularly relevant since the average capital-output ratios are most easily related to incremental net capital-output ratios) we can find no support in the data for the past. In Table 13, the range in the average ratios from Group I to the low income groups was from over 5 to a level not much above a third. No such range is suggested by the average capital-output ratios in the sources cited in footnotes 22-24.

It would seem that, like the high capital formation proportions in recent years in the low income countries, and the limited range in these capital formation proportions among countries grouped by per capita income, the wide range in the incremental capital-output ratios between the high and the low income countries observed for recent years is probably not typical of the longer-range past. The very fact that the annual rate of growth of domestic or national product in Groups VI and VII is 1.7 times the rate in Group I (see Table 13, lines 4 and 7, columns 8 and 11) supports this inference--for surely over the long-term past the rate of growth must have been higher in countries in Group I than in those in Groups VI and VII. Clearly, the rates of increase in domestic or national product (gross or net) were much higher during recent years in the low income countries than they could have been over the long run in the past. The capital formation proportions must also have been significantly higher during recent years. But it also seems likely that the former rose to higher relative levels in recent years than the latter. To illustrate, if we assume that in the past net capital formation proportions in the less developed countries ranged from 3 to 5 percent, and the rates of growth of countrywide net product per year ranged from 1 to 1.5 percent, the incremental net capital-output ratio was about 3.0--somewhat lower than for the more advanced countries. These past capital formation proportions are from less than half to about seven-tenths of those for recent years (7.5 percent for Groups VI and VII in Table 13), whereas the rates of growth are from less than a quarter to about a third of those for

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22. See Paper IV, Appendix Table 2, p. 63.

23. Ibid., Appendix Table 3, p. 65.

24. See Raymond Goldsmith and Christopher Saunders, ed., op. cit., Table VII, p. 32.

recent years (4.5 percent per year for Groups VI and VII in Table 13). In other words, while the recent years were probably marked by a significant rise in capital formation proportions in the low income, less developed countries, there was an even greater relative rise in the rate of growth of countrywide product per year; and as a result, at least for this short recent period, the incremental capital-output ratios were substantially lowered.

VII. Distribution of Gross Domestic Capital Formation by Type of Purchaser and by Source of Financing

For the recent post-World War II years we have the distribution (sometimes incomplete) of gross fixed capital formation by type of purchaser for twenty-four countries (Table 17). But since fixed capital formation accounts for an overwhelming proportion of gross domestic capital formation, the shares in Table 17 can be viewed as approximations to the distribution of the latter.

Private enterprises, largely individual firms and private corporations (including individual owners of dwellings treated as private firms) purchase from six- to seven-tenths of gross fixed, and probably also of gross domestic capital formation (line 2). The share of these private purchasers declines somewhat as we move down to Groups IV and V, and VI and VII, where governments play a larger role as purchasers of durable capital than they do in the high income, more advanced countries. The statements apply, of course, to the non-Communist countries to which Tables 17-19 are limited.

For twenty-one of the twenty-four countries we have direct information on the share of gross fixed capital formation purchased by general government (i.e., excluding public enterprises and corporations). As would be expected from the decline in the share of private purchasers as one moves to the low income, less developed countries, the share purchased by general government is higher in the latter--particularly in Groups VI and VII (line 4). The derived share of public and government enterprises drops sharply from Groups IV and V to Groups VI and VII, but little significance can be attributed to this movement since the share is calculated from subtrahends and diminuends based on different samples (line 5).

It is interesting that government plays a greater role as a purchaser of capital goods in the low income, less developed countries despite the fact that government consumption is a distinctly lower share of gross national product than in the high income countries (line 7). In other words, the reason for the more active role of government in the purchase of capital goods in the less developed countries is not that it needs a higher proportion of capital goods to produce the goods that it consumes. Nor is there a close association between the role of the government as purchaser of gross fixed capital formation and its contribution to gross domestic product: the share of government in gross domestic product in Groups VI and VII is not much greater than it is in Group I (line 9). Presumably, the reason for the large share of capital formation purchased by government in the low income, less developed countries, is that it fosters and directs capital investment.

A somewhat similar pattern emerges when we consider the sources of financing (Table 18). Here we must first take account of the differences, already noted in connection with Table 1, in the extent to which foreign funds finance

Table 17.
Distribution of Gross Fixed Capital Formation by Type of Purchaser, Compared With Shares of Government Consumption in Gross National Product and of the Government Sector Product in Gross Domestic Product, Countries Grouped by Per Capita Product, Post-World War II Years
(Based on current price totals)

	Wider Groups of Countries by Per Capita Product							
	I	II & III		IV & V		VI & VII		
	(1)	(2)		(3)		(4)		
Share in Gross Fixed Capital Formation								
1. Number of countries in line 2	7	3	(2)	4	(3)	10	(4)	
2. Share of purchases by private enterprises (%)	67.3	67.2	(71.4)	63.8	(63.9)	58.9	(61.0)	
3. Number of countries in line 4	5	5	(4)	4	(4)	7	(2)	
4. Share of purchases by general government (%)	12.8	12.8	(13.1)	14.5	(14.5)	26.2	(30.1)	
5. Derived share of purchases by public and government enterprises (%) (100 - line 2 - line 4)	20	20	(16)	22	(22)	15	(9)	
Share in Gross National Product								
6. Number of countries in line 7	8	12	(9)	17	(13)	16	(8)	
7. Share of government consumption expenditures (%)	14.2	14.0	(13.2)	11.6	(11.5)	10.6	(10.5)	
Share in Gross Domestic Product								
8. Number of countries in line 9	6	12	(9)	16	(13)	22	(13)	
9. Share of public administration and defense sector (%)	7.0	10.0	(8.7)	7.0	(7.2)	7.7	(7.8)	

Entries are unweighted arithmetic means of percentages for individual countries. Those in parentheses are for countries excluding politically and financially dependent units (listed in the notes to Table 1 and, in lines 8 and 9, Kenya and Uganda). However, the various measures are not repeated for Group I, from which there are no exclusions.

Lines 1 and 2: based on Appendix Table 3, column 7.
Lines 3 and 4: based on Appendix Table 3, column 8.
Lines 6 and 7: based on Appendix Table 6, column 1.
Lines 8 and 9: based on Appendix Table 6, column 2.

Table 18.
Shares in Gross Domestic Capital Formation Financing, Countries Grouped by Per Capita Product, Post-World War II Years (Based on current price totals)

	Wider Groups of Countries by Per Capita Product			
	I (1)	II & III (2)	IV & V (3)	VI & VII (4)
1. Number of countries in lines 2 and 3	8	13 (10)	17 (13)	18 (10)
2. Share of foreign financing in gross domestic capital formation (%)	0.5	18.5 (2.6)	8.7 (7.7)	18.4 (8.5)
3. Share of gross domestic financing in gross domestic capital formation (%) (100 - line 2)	99.5	81.5 (97.4)	91.3 (92.3)	81.6 (91.5)
4. Number of countries in lines 5 and 6	7	12 (9)	13 (10)	12 (7)
5. Share of capital consumption in gross domestic capital formation (%)	41.2	40.7 (44.8)	33.2 (32.4)	37.6 (45.5)
6. Share of net domestic savings in gross domestic capital formation (%)	57.7	39.0 (51.9)	51.4 (59.5)	49.8 (47.5)
7. Derived share of net domestic in gross domestic savings (%) [line 6 + (line 5 + line 6)]	58.3	48.9 (53.7)	60.8 (64.6)	57.0 (51.1)
8. Number of countries in lines 9 and 10	5	6 (5)	7 (5)	7 (4)
9. Share of net domestic savings in gross domestic capital formation (%)	54.3	58.1 (62.4)	49.8 (61.4)	44.6 (35.1)
10. Share of net savings of households in gross domestic capital formation (%)	31.0	27.9 (27.4)	16.3 (28.4)	12.4 (6.6)
11. Derived share of net savings of households in net domestic savings (%) (line 10 + line 9)	57.1	48.0 (43.9)	32.7 (46.3)	27.8 (18.8)
12. Number of countries in lines 13 and 14	3	7 (6)	8 (5)	8 (4)
13. Share of net domestic savings in gross domestic capital formation (%)	49.0	58.6 (62.3)	43.0 (53.5)	51.4 (50.5)

14. Share of net savings of general government in gross domestic capital formation (%)	5.0	19.2 (23.5)	14.4 (14.5)	15.4 (14.6)
15. Derived share of net savings of general government in net domestic savings (%) (line 14 + line 13)	10.2	32.8 (37.7)	33.5 (27.1)	30.0 (28.9)
16. Derived share of net savings of private and public corporations in net domestic savings (%) (100 - line 11 - line 15)	32.7	19.2 (18.4)	33.8 (26.6)	42.2 (52.3)
17. Number of countries in lines 18 and 19	5	1 (0)	2 (1)	4 (4)
18. Share of net domestic savings in gross domestic capital formation (%)	54.3	66.1	50.6 (76.6)	35.1 (35.1)
19. Share of savings of private corporations in gross domestic capital formation (%)	14.0	18.8	13.8 (14.1)	15.2 (15.2)
20. Derived share of savings of private corporations in net domestic savings (%) (line 19 + line 18)	25.8	28.4	27.3 (18.4)	43.3 (43.3)
21. Derived share of savings of public corporations in net domestic savings (%) (line 16 - line 20)	6.9	-9.2	6.5 (8.2)	-1.1 (9.0)

Shares are unweighted arithmetic means of percentages for individual countries.

Entries in parentheses are for countries excluding politically and financially dependent units (listed in the notes to Table 1). However, the various measures are not repeated for Group I, from which there are no exclusions.

Line 1: from Table 1, lines 7 and 19.
Line 2: from Table 1, lines 8 and 21.
Line 4: from Table 4, line 3.
Line 5: from Table 4, line 4 (and by a similar procedure for countries excluding dependent units).
Lines 6, 9, 13 and 18: based on Appendix Table 6, column 3.
Line 10: based on Appendix Table 6, column 4.
Line 14: based on Appendix Table 6, column 5.
Line 19: based on Appendix Table 6, column 6.

gross domestic capital formation. If we take all countries, including those politically and financially dependent, Groups II and III, and VI and VII show close to a fifth of gross domestic capital formation financed by foreign funds. If we exclude the dependent units, the average share of foreign financing drops materially; but it is still 9 percent of gross domestic capital formation in Groups VI and VII and less than 1 percent in Group I (line 3).

But our main interest here is in domestic financing--which for gross capital formation consists of funds from capital consumption charges and net domestic financing. By and large, the funds derived from provision for capital consumption account for about four-tenths to a half, and net domestic savings account for a half to six-tenths of gross domestic savings or financing (line 7). There appear to be no significant differences among countries grouped by per capita income in the distribution of gross domestic financing or saving between capital consumption funds and net domestic savings.

Capital consumption charges are provided for by all holders of fixed and depreciable capital goods--individuals owning dwellings, private firms, private corporations, general government, and government enterprises and corporations. If the finding in Table 17--that the government purchases a larger share of fixed capital goods in the low income countries than in the high--is valid for a fairly long period, and if government and government enterprises provide for capital consumption in the same fashion as the private sector, the share of government in capital consumption charges in the low income countries would also be larger. But this conjecture is subject to too many qualifications to be given much weight.

Part of capital consumption charges is on account of individuals as owners of dwellings and of private unincorporated firms, but their share in the total in the industrialized countries must be relatively limited: residential construction is about a fifth of total fixed capital formation; its economic life span is much longer than that of other fixed capital goods; a substantial fraction of residential housing is owned by business corporations and governments; and the share of unincorporated business is small. If we allow about a tenth of capital consumption to be credited to households owning their own dwellings and another tenth for unincorporated firms, the 40 to 50 percent share of capital consumption in gross domestic savings would include 32 to 40 percent for private corporations, government corporations, and governments. The other 60 to 70 percent of gross domestic savings is accounted for partly by net savings of non-household units, partly by savings of households.[25] The share of the latter, on a net basis, is available for a few countries. The net savings of households account for between 19 and 57 percent of net domestic savings, declining perceptibly, as we move down the scale of per capita income, from 57 percent in Group I to either 28 or 19 percent in Groups VI and VII (line 11).

Two conclusions are immediately suggested. First, the contribution of individuals and households must account for a rather moderate share of total domestic financing of gross domestic capital formation. Even in Group I, the

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25. These are defined in the estimates to include all individual owners of unincorporated business firms and dwellings--in addition to households not owning a business or a dwelling.

share of savings of households in gross domestic capital formation (which is only half a percent different from gross domestic financing) averages 31 percent (line 10). If we add 8 percent, to allow for capital consumption charges on owner-occupied dwellings and unincorporated business, the percentage becomes 39. Thus, of the total domestic financing of gross domestic capital formation in Group I less than four-tenths is contributed by individuals and households. In Groups VI and VII the contribution of savings by individuals and households is even more moderate. If we exclude politically and financially dependent units, the share of net savings of households in gross domestic financing is about 7 percent (6.6/0.915); and if we add another 5 percent for consumption charges on owner-occupied dwellings and perhaps as much as 20 percent for private unincorporated firms (capital consumption charges), the total becomes 32 percent. The rest of domestic gross savings is presumably contributed by governments, public and government enterprises, and private corporations. Second, the relative contribution of net savings by households to gross domestic capital formation is materially lower in the low income countries than in the high income countries: it drops from 31 percent in Group I to either 12 or 7 percent in Groups VI and VII.

The net savings of governments account for between 5 and 20 percent of gross domestic capital formation, but the movement is from a low of 5 percent in Group I to a high of 15 percent in Groups VI and VII (line 14). Of the 58 to 50 percent share of net domestic savings in gross capital formation (line 6), we are thus left with about 20 percent for the share of net savings of private corporations, public corporations, and government enterprises in gross capital formation in Group I and about 28 to 23 percent in Groups VI and VII. Since private corporations are so much more important relative to public corporations and government enterprises in Group I than in Groups VI and VII, we may assume that the share of these private corporations in the financing of gross capital formation is larger in the high income, developed countries than in the low income, underdeveloped countries. In other words, the difference in the relative contribution of net savings by households to gross domestic capital formation between high and low income countries is made up partly by greater foreign financing in the latter, partly by greater contribution of savings by governments, and partly (probably) by greater contribution of savings by public corporations and government enterprises.

The sharp drop in the share of the savings of households and individuals in gross domestic capital formation as we go down the scale of per capita income (Table 18, line 10) suggests, of course, that the scarcity of household savings sets a limit to the national, and even domestic, capital formation proportions. At any rate, it is of interest to trace the ratio of savings of households to gross domestic capital formation from the relation of income received by households to gross domestic product, and the household savings-disposable income ratio (Table 19).

The calculations are based on data for the same twenty-three countries throughout, but the small number in the groups distinguished by per capita income bars hard and fast inferences. However, a few broad observations can be made.

First, the differences in gross capital formation proportions observed among the wide groups are not large: from 21 percent in Group I to 16 percent

Table 19.
Relation Between Household Income and Savings and Gross Domestic Capital Formation Financing, Countries Grouped by Per Capita Product, Post-World War II Years (Based on current price totals)

		Wider Groups of Countries by Per Capita Product			
		I (1)	II & III (2)	IV & V (3)	VI & VII (4)
1.	Number of countries	6	5 (4)	6 (4)	7 (4)
2.	Ratio, gross domestic capital formation to gross domestic product (%)	20.7	19.5 (20.8)	19.4 (21.6)	21.2 (16.1)
3.	Ratio, income of households to gross domestic product (%)	81.5	85.6 (84.8)	80.1 (79.2)	75.3 (77.8)
4.	Ratio, direct taxes to income of households (%)	12.9	13.7 (15.8)	4.6 (5.4)	2.8 (1.8)
5.	Ratio, disposable income to gross domestic product (%)	71.0	74.0 (71.4)	76.5 (75.0)	73.3 (76.4)
6.	Ratio, household savings to disposable income (%)	8.5	7.1 (7.5)	5.2 (9.0)	3.8 (1.4)
7.	Ratio, household savings to gross domestic product (%)	6.1	5.2 (5.4)	3.8 (6.6)	2.9 (1.2)
8.	Ratio, household savings to gross domestic capital formation (%)	29.7	27.1 (26.4)	15.3 (30.0)	12.4 (6.6)
9.	Derived ratio, household savings to gross domestic capital formation (%) (line 7 + line 2)	29.5	26.7 (26.0)	19.6 (30.6)	13.7 (7.5)

Ratios, except in line 9, are unweighted arithmetic means of percentages for individual countries, given in Appendix Table 1, column 4 and Appendix Table 7.

Entries in parentheses are for countries excluding politically and financially dependent units (listed in the notes to Table 1). However, the various measures are not repeated for Group I, from which there are no exclusions.

in Groups VI and VII, excluding dependent units (line 2). But since the range of differences in these proportions for the larger sample in Table 1 was not much wider, the small sample is not a serious qualification here.

Second, the average ratio of income of households to gross domestic product declines slightly as we move from the high to the low income countries, due to the larger share in the latter of the combined total of government and corporate income, taxes, depreciation, and other differences between income of households and gross domestic product (line 3). This result is somewhat unexpected, and a larger sample might reverse the finding. However, the proportion of direct taxes (deducted from income of households to derive disposable income) to income of households drops perceptibly, in accord with expectation, as we move from the high to the low income countries (line 4). As the conflicting movements in lines 3 and 4 cancel each other, the share of disposable income in gross domestic product shows no significant differences among countries grouped by per capita income and indeed is lowest in Group I (line 5).

Third, the real difference is in the ratio of savings to disposable income--which drops from 8 percent in Group I to slightly over 1 (or under 4) percent in Groups VI and VII (line 6). It is this difference among countries in the savings-disposable income ratio, which--despite the higher incidence of direct taxes in Group I--produces the lower ratio of household savings to gross domestic product (line 7) and the lower ratio of household savings to gross domestic capital formation in the low income countries (line 8). The alternative calculation of the latter ratio (line 9)--from the averages in lines 2 and 7, rather than from the ratios for individual countries--shows results similar to those in line 8: a drop from close to three-tenths in Group I (not much different from the 31 percent in Table 18) to 7 percent in Groups VI and VII if we exclude the politically and financially dependent units (7 percent also in Table 18).

In concluding this section on the distribution of capital formation by type of purchaser and by source of financing, one may ask whether the findings based on the data for the post-World War II years are relevant to the longer run of the pre-World War II past. Was the larger role of the government as a purchaser of fixed capital goods in the less developed countries true of the longer-run past? Was the high proportion of capital consumption charges to gross domestic savings--about four-tenths in both high and low income countries--characteristic of the past? Was the limited share of household savings in net domestic savings--only four-tenths even in the high income countries--true of the past? Was the appreciably lower ratio of household savings to gross domestic capital formation in the low income countries, associated with a lower ratio of household savings to disposable income, representative of a long standing difference between high and low income countries?

In the next paper, which will deal with long-term records, there will be little opportunity to check on any conjectures indulged in here in trying to answer these questions: no long-term data on sources of financing are available, except for one or two countries. But if we consider that the gross domestic capital formation proportions in recent post-World War II years are probably much higher, particularly for the low income countries, than they could have been in the long run; that independent governments in many of these countries are a recent development, as is the acute concern with capital investment and economic growth--the answers must be, if not a flat 'no', a qualified 'unlikely'.

It is not likely that in the past government played a much larger role in the purchase of capital equipment in the less developed than in the high income countries--unless the former were colonies and capital formation was the major concern of the metropolitan government. It is not likely that provisions for capital consumption were a high fraction of the gross sources of funds for financing domestic capital formation in the low income countries; and if one goes far enough back, even in the high income countries. And we cannot be sure that with rather low gross domestic capital formation proportions, the share financed by savings of households was so low in the underdeveloped countries in the past; or, if we go far enough back, in the high income countries. Indeed, the only finding that might reasonably apply to the longer-term past relates to the lower savings-disposable income ratio for the low income countries. It is likely that over the longer-term period, going back to the mid-19th century, or even earlier, the ratio of savings to disposable income was much lower in the less developed, low income countries than it was in the high income countries; and indeed, the absolute, and perhaps relative, disparity in the savings-disposable income ratios might well have been greater in the past than it was during the post-World War II years.

Appendix Table 1.
Gross Capital Formation Proportions and Share of M+ Sector, Averages for Post-World War II Years

Countries Grouped by Per Capita Product	Period Covered (unless otherwise indicated)	% Proportion to Gross Domestic Product of: Gross Fixed Capital Formation	Change in Stocks	Gross Domestic Capital Formation	Change in Foreign Claims as % of Gross Domestic Capital Formation	Gross Capital Formation as % of Gross National Product	Share of M+ Sector in Gross Domestic Product (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Group I							
1. Australia	1951-57	25.8	2.1	27.9	-9.8	25.6	
2. Belgium	1951-57	15.3	0.9	16.1	10.2	17.6	58.6
3. Canada	1951-57	23.5	1.7	25.2	-9.9	23.0	49.8
4. New Zealand	1951-57	21.8	1.6	23.4	-9.7	21.4	(1948-53)39.8
5. Sweden	1951-57	19.9	1.6	21.4	1.3	21.7	(1949-53)54.8
6. Switzerland	1954-57			23.4	6.3	24.4	
7. United Kingdom	1951-57	14.2	1.4	15.7	3.6	16.1	57.6
8. United States	1951-57	16.8	1.3	18.0	3.7	18.6	47.4[a]
Group II							
9. Denmark	1951-57	17.6	0.9	18.5	-0.4	18.5	46.4
10. Finland	1951-57	26.0		26.0[b]	3.5[b]	27.0[c]	48.9
11. France	1951-57	17.3	0.9	18.2	-6.0	17.2	(1947-49)46.8
12. Germany, West	1951-57	21.1	2.3	23.4	13.5	26.6	57.9
13. Netherlands	1951-57	22.4	1.7	24.1	6.0	25.2	50.9
14. Norway	1951-57	28.0	1.6	29.6	-6.2	27.9	56.7
15. Venezuela	1951-57	22.5	1.3	23.7	-8.2	24.4	

(Continued on next page)

Appendix Table 1 (cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Group III							
16. Argentina	1951-57	19.7	0.2	19.9	-8.7	18.2	28.2[e]
17. Austria	1951-57	21.3[d]	0.8[d]	22.1[d]	-5.8	20.8	58.6[d]
18. Chile	1951-57	(1951-54)8.8	(1951-54)0.1	9.5	-13.9	8.4	33.2[a]
19. Ireland	1951-57	14.5	0.2	14.7	-39.3	8.6	26.7[f]
20. Israel	1951-57	(1951-56)24.0	(1951-56)0.6	25.0	-86.8	3.3	(1952-57)37.0[a]
21. Puerto Rico	1951-57	19.1	0.7	19.8	-88.3	2.2	34.1
Group IV							
22. Brazil	1951-57	14.3	2.6	16.8	-5.9	16.0	33.2[a]
23. Colombia	1951-57	11.4	1.0	12.4	-3.5	12.0	27.2[a]
24. Costa Rica	1951-57	18.8	1.6	20.4	-17.7	17.1	18.1[g]
25. Cuba	1951-57	14.8	0.4	15.2	-14.7	13.2	
26. Greece	1951-57	14.4	2.2	16.6	-43.5	9.2	31.5
27. Italy	1951-57	20.1	0.7	20.9	-9.8	18.8	48.2
28. Malaya	1950-53	8.2	0	8.2	81.0	15.9	
29. Mexico	1952-57	14.3[d]	2.2[d]	16.5[d]	-2.6	16.1	(1947-50)28.9[a]
30. Panama	1950-56	11.5	2.1	13.6	-36.4	8.2	(1954-56)18.0
31. Turkey	1951-55	13.1		13.1[b]	-21.5[b]	10.3	25.3
32. Union of South Africa	1951-57	23.9[d]	1.5[d]	25.4[d]	-12.4	22.2	(1950-56)44.7[ag]
Group V							
33. Dominican Rep.	1951-57			17.8[d]	7.7	19.1	(1946)20.5
34. Guatemala	1951-57			11.4	-10.9	10.3	(1949)35.7
35. Iraq	1950-56	14.2	0.6	14.8	19.4	20.6	
36. Jamaica	1951-56	15.5	1.3	16.8	-48.5	8.7	34.3
37. Japan	1951-57	21.7	7.0	28.7	2.4	29.5	41.0[a]
38. Portugal	1952-57	14.5	1.7	16.2	-30.3	11.3	42.9
Group VI							
39. Bolivia[h]	1950-55			14.6	-11.1[i]	13.0[i]	47.2[j]
40. Ceylon	1951-57	10.3	0.8	11.1	12.0	12.6	21.7
41. China (Taiwan)	1951-57	12.4	4.7	17.1	-34.5	11.2	30.7

42.	Ecuador	1951-57	12.3	2.1	14.4	-9.7	13.4	(1951-56)26.6
43.	Egypt	1951-56	11.0	1.2	12.2	-17.3[i]	10.1[i]	(1951-54)19.9[ak]
44.	Ghana	1951-57	11.4	0.4	11.8	23.8	14.9	
45.	Honduras	1951-57	13.9	1.1	15.1	-8.8	14.1	21.0
46.	Peru	1951-56	23.8[d]	2.3[d]	26.1[d]	-13.2	22.6	33.7[l]
47.	Philippines	1951-57	7.2	1.3	8.6	-26.3	6.4	20.6[m]
48.	Rhodesia & Nyasaland	1951-57			35.8	-34.5	26.3	(1948)43.3[a]
	Group VII							
49.	Belgian Congo	1951-57	26.5	2.6	29.1	-9.2	27.9	47.6
50.	Burma	1951-57	16.7	2.4	19.1	8.5	20.8	17.5[n]
51.	Haiti	1953-55			8.2	-11.1	7.3	
52.	India[h]	1950-56			10.8	-8.2	9.9	
53.	Indonesia	1951-52			5.0	-49.7	2.5	14.8[a]
54.	Korea, South	1955-57	10.6	0.2	10.8	-118.8	-2.0	16.2
55.	Morocco	1951-56	18.7	0.6	19.3	-10.2	16.5	29.3[f]
56.	Nigeria	1952 & 1956	9.2	0.5	9.8	-13.3	8.5	12.8[f]

Entries are percentages based on current price values, unless otherwise indicated.

Sources: United Nations, Yearbook of National Accounts Statistics, 1958, New York, 1959 except for lines 28, 51, 52, and 53 and column 7, lines 4, 5, 11, 29, 33, 34, and 48.

Lines 28, 51, and 53 are from ibid., 1957.

Line 52 is based on estimates by Wilfred Malenbaum in "India and China: Contrasts in Development Performance," American Economic Review, Vol. XLIX, No. 3, June 1959, Table 1, p. 287 and text, p. 289.

Column 7, lines 4, 11, 29, 33, and 34 are from Simon Kuznets, "Quantitative Aspects of the Economic Growth of Nations, II. Industrial Distribution of National Product and Labor Force," Economic Development and Cultural Change, Supplement to Vol. V, No. 4, July 1957, App. Table 1, pp. 62 ff.

Column 7, line 5 is from Osten Johansson, "Economic Structure and Growth in Sweden, 1861-1953," mimeographed paper prepared for the 1959 meeting of the International Association for Research in Income and Wealth, held at Portoroz, Yugoslavia, Table 17.

Column 7, line 48, is from United Nations, Statistical Papers, Series H, No. 8 and is based on the sum of the estimates for Nyasaland, Northern Rhodesia, and Southern Rhodesia.

a. Share in NDP.
b. GDCF excludes increase in stocks.
c. GCF excludes increase in stocks.
d. Ratio to GNP.
e. M+ sector excludes utilities and transportation.
f. M+ sector excludes transportation.
g. M+ sector excludes utilities and public enterprises.
h. Based on constant price values.
i. Change in foreign claims excludes net factor income from abroad.
j. M+ sector excludes utilities.
k. M+ sector excludes public enterprises.
l. Share in GNP.
m. Share in NNP.
n. M+ sector excludes private transportation.

Appendix Table 2.
Capital Consumption, Net Capital Formation Proportions, and Distribution of Post-World War II Years

Countries Grouped by Per Capita Product	Capital Consumption as % of: Gross Fixed Capital Formation (1)	Capital Consumption as % of: Gross Domestic Capital Formation (2)	Net Domestic Capital Formation as % of Net Domestic Product (3)
Group I			
1. Australia	21.8	20.2	23.6
2. Belgium	64.1	60.6	7.0
3. Canada	46.1	43.0	16.1
4. New Zealand	30.5	28.4	18.0
5. Sweden			
6. Switzerland	35.8	35.8	16.4
7. United Kingdom	56.9	51.7	8.3
8. United States	52.1	48.4	10.2
Group II			
9. Denmark	35.6	33.8	13.1
10. Finland	18.5		22.3[a]
11. France	54.3	51.5	9.7
12. Germany, West	44.4	40.0	15.5
13. Netherlands	42.9	39.9	16.0
14. Norway	33.6	31.7	22.3
15. Venezuela	41.6	39.4	15.9
Group III			
16. Argentina	50.7	50.3	11.0
17. Austria	32.9	31.8	16.2[b]
18. Chile		84.4	1.6
19. Ireland	24.7	24.3	11.6
20. Israel		29.0	19.1
21. Puerto Rico	33.0	31.9	14.4
Group IV			
22. Brazil	34.8	29.5	12.5
23. Colombia	48.2	44.3	7.3
24. Costa Rica	29.4	27.1	15.8
25. Cuba	36.8	35.9	10.3
26. Greece	24.5	21.3	13.6
27. Italy	44.4	42.9	13.1
28. Malaya			
29. Mexico			
30. Panama	(1953-56)53.5	(1953-56)51.3	(1953-56) 6.8
31. Turkey	30.2		9.5[a]
32. Union of South Africa	28.9	27.3	19.8[b]

Gross Domestic Capital Formation by Type of Capital Good, Averages for

Net Capital Formation as % of Net National Product	% Share in Gross Domestic Capital Formation of: Residential Construction	Other Construction	Producers' Equipment	Change in Stocks
(4)	(5)	(6)	(7)	(8)
21.1				7.6
8.8	23.3	27.0	44.4	5.4
13.5	18.6	41.3	33.5	6.7
15.7	21.4			6.9
	22.7	35.1	34.9	7.2
17.6	22.9	38.8		
8.8	19.8	24.4	46.8	9.0
10.9	24.3	34.7	34.1	7.0
13.0	15.3	24.8	54.8	5.1
23.3[a]				
8.6	23.0	26.8	45.1	5.2
19.0		42.5	47.5	9.9
17.3	18.6	27.7	46.6	7.1
20.4	16.2	28.3	50.0	5.5
15.6				5.3
9.1		55.7	43.5	0.8
14.8	19.1	28.3	48.9	3.6
0.2	(1951-54)33.0	(1951-54)25.7	(1951-54)40.1	(1951-54)1.3
5.4	19.0	36.8	42.6	1.7
-4.3	(1951-56)33.2	(1951-56)35.1	(1951-56)29.3	(1951-56)2.4
-4.0	22.7	42.9	31.0	3.3
11.5				15.3
6.9		30.1	61.8	8.1
12.1				7.8
8.1				2.5
6.0	27.7	30.4	28.8	13.1
10.8	22.7			3.5
				0
				13.3
(1953-56) 3.2		48.9	35.7	15.5
6.6[a]				
16.4		54.8	39.5	5.7

(Continued on next page)

Appendix Table 2 (Cont.)

		(1)	(2)	(3)
	Group V			
33.	Guatemala		31.9	8.0
34.	Iraq	30.9	29.7	10.9
35.	Jamaica	37.6	34.7	11.7
36.	Japan	33.1	25.0	23.2
37.	Portugal	34.0	30.4	11.8
	Group VI			
38.	Bolivia[c]		73.8	4.3
39.	Ceylon	15.1	14.0	9.7
40.	China (Taiwan)	44.2	32.0	12.3
41.	Ecuador	38.8	33.1	10.1
42.	Egypt			
43.	Ghana			
44.	Honduras	35.7	33.0	10.6
45.	Peru	85.1	77.7	7.3[b]
46.	Philippines	67.4	57.0	3.9
47.	Rhodesia & Nyasaland		17.5	31.5
	Group VII			
48.	Belgian Congo	30.0	27.3	23.0
49.	Burma	34.6	30.2	14.2
50.	India			5.0
51.	Korea, South			
52.	Morocco	30.4	29.4	14.5
53.	Nigeria	27.9	26.4	7.4

Entries are percentages based on current price values for the periods covered in Appendix Table 1 unless otherwise indicated.

Sources: Those given in Appendix Table 1 except for line 50.

Line 50: Net domestic product at factor cost, given in the United Nations, Yearbook of National Accounts Statistics, 1958, was adjusted to the market price basis by the ratio of the latter to the former in Ceylon and Burma, given in ibid., and net national product was derived by the addition of net factor income from abroad, also given in ibid. Net domestic capital formation and net capital formation are from Wilfred Malenbaum, East and West in India's Development, National Planning Association, April 1959, Table 3, p. 28.

a. Capital formation excluding change in stocks.
b. Ratio to NNP.
c. Based on constant price values.
d. Ratio to NDP.

(4)	(5)	(6)	(7)	(8)
6.8				
16.3				3.9
3.0				7.7
24.0	6.1			24.5
6.7	19.8	42.0	27.6	10.5
2.5[d]		43.1		
11.2		69.6	22.9	7.5
6.1		35.6	36.8	27.5
8.9	12.4	29.9	42.9	14.8
				9.8
		62.1	34.5	3.5
9.5	(1951-55)21.6	(1951-55)43.5	(1951-55)26.5	7.5
3.0		42.8	48.4	8.7
1.5	16.8	32.4	35.3	15.5
20.7				
21.4				9.0
15.9		61.6	25.7	12.7
5.1				
	6.7	61.8	29.3	2.2
11.7	22.2	32.6	42.3	3.0
6.1	23.3	37.5	33.9	5.3

Appendix Table 3.
Rise Per Year in National Product, Gross Capital-Output Ratio, and Shares of for Post-World War II Years

	Countries Grouped by Per Capita Product	Percent Rise per Year in: Gross Domestic Product (1)	Gross National Product (2)	Net Domestic Product (3)	Net National Product (4)
	Group I				
1.	Australia	1.51	1.52	0.84	0.84
2.	Belgium	2.80	2.86	2.54	2.61
3.	Canada	4.21	4.19	3.95	3.92
4.	New Zealand	2.83	2.80	2.63	2.60
5.	Sweden	3.80	3.83		
6.	United Kingdom	2.45	2.35	2.40	2.30
7.	United States	2.94	2.95	2.57	2.60
	Group II				
8.	Denmark	2.70	2.72	2.45	2.46
9.	Finland	3.48	3.49	2.95	2.97
10.	France	4.66	4.64	4.97	4.95
11.	Germany, West	7.50	7.45	7.60	7.54
12.	Netherlands	5.25	5.23	5.47	5.44
13.	Norway	3.77	3.70	3.49	3.40
14.	Venezuela	11.29	11.86	11.22	11.85
	Group III				
15.	Argentina	1.45	1.47	1.32	1.34
16.	Austria		5.88		5.76
17.	Chile	2.74	2.68	2.76	2.70
18.	Ireland	1.50	1.34	1.27	1.10
19.	Israel	8.52	8.46	8.46	8.38
20.	Puerto Rico	4.02	2.87	3.63	2.43
	Group IV				
21.	Brazil	4.67	4.67	4.67	4.67
22.	Colombia	5.01	5.33	4.66	4.90
23.	Costa Rica	6.76	7.05	6.52	6.83
24.	Greece	6.57	6.83	6.69	6.95
25.	Italy	5.35	5.38	5.36	5.39
26.	Malaya				
27.	Mexico		(1952-57)5.94		
28.	Turkey	(1951-56)4.60	(1951-56)4.56	(1951-56)4.44	(1951-56)4.40
29.	Union of South Africa		5.44		5.27

Private and Government Purchases in Gross Fixed Capital Formation, Averages

	Ratio to Additions to Gross Product in Constant Prices of Gross Domestic Capital Formation in:		Percentage of Gross Fixed Capital Formation Purchased by:	
	Current Prices	Constant Prices	Private Enterprises	General Government
	(5)	(6)	(7)	(8)
	18.48		66.5	
	5.75	5.54	76.9	10.8
	5.99	5.70	74.0	14.3
	8.27		57.8	
	5.63	5.58	59.9	15.6
	6.41	6.24	51.5	10.0
	6.12	6.02	84.7	13.3
	6.85	6.56	77.9	10.6
	7.47			15.9
	3.91	3.90		11.0
	3.12	3.07		
	4.59	4.55	65.0	14.8
	7.85	8.20		
	2.10	2.10		
	13.72	15.17		
	3.76	3.86		
	3.47	3.58		
	9.80	9.53		11.9
	2.93			
	4.93	4.80	58.8	
	3.60			
	2.48			
	3.02			15.2
	2.53	2.56		
	3.91	3.85		12.6
			63.7	
(1952-57)	2.78		62.7	18.6
	4.67		63.9	11.8

(Continued on next page)

Appendix Table 3 (Cont.)

		(1)		(2)		(3)		(4)
	Group V							
30.	Dominican Rep.			8.90				
31.	Guatemala		5.80		5.53		5.84	5.56
32.	Iraq	(1950-56)	11.57	(1950-56)	10.20	(1950-56)	11.59	(1950-56) 10.15
33.	Jamaica	(1951-56)	11.37	(1951-56)	11.22	(1951-56)	11.02	(1951-56) 10.86
34.	Japan		8.25		8.18		7.61	7.54
35.	Portugal	(1952-57)	4.14	(1952-57)	4.15	(1952-57)	4.11	(1952-57) 4.12
	Group VI							
36.	Bolivia	(1950-55)	1.21			(1950-55)	1.22	
37.	Ceylon		3.32		3.39		3.18	3.25
38.	China (Taiwan)		9.44		9.42		9.52	9.50
39.	Ecuador		5.50		5.31		5.64	5.44
40.	Egypt	(1951-56)	5.92					
41.	Ghana		2.13		2.30			
42.	Honduras		3.02		4.25		2.92	4.21
43.	Paraguay	(1950-55)	12.85			(1950-55)	12.15	
44.	Peru			(1951-56)	4.62			(1951-56) 3.02
45.	Philippines		6.81		6.70		6.87	6.75
46.	Rhodesia & Nyasaland							
	Group VII							
47.	Belgian Congo		4.27		3.77		3.48	2.90
48.	Burma		6.01		6.04		6.12	6.16
49.	India					(1950-56)	3.65	(1950-56) 3.71
50.	Kenya						3.78	
51.	Korea, South							
52.	Morocco	(1951-56)	3.08	(1951-56)	3.50	(1951-56)	2.65	(1951-56) 3.12
53.	Nigeria							
54.	Pakistan						2.96	2.96
55.	Uganda						-0.51	

Columns 1-4: Entries are geometric means based on the increase in constant market price values from 1951 to 1957, unless otherwise indicated.

Columns 1 and 2: Constant price values are from United Nations, Yearbook of National Accounts Statistics, 1958 except for lines 1; 4; 6, col. 2; 9; 10, col. 1; 19; 21-23; 27; 28, col. 2; 29; 30; 32; 33; 34; 37, col. 1; 38; 39; 40; 41; 44; 45; 47, col. 2; 48, col. 2; and 52, col. 2.

Lines 1, 4, 19, 22, 23, 27, 29, 30, 32, 33, 34, 38, 40, 41, 44, 45 are based on constant price values derived by deflating current price values, given in ibid., by the cost of living indexes, given in the United Nations, Statistical Yearbook, 1958.

Lines 6, 28, 47, 48, 52, col. 2 are based on constant price values derived by deflating current price values by the price index implicit in gross domestic product, both from the Yearbook of National Accounts Statistics, 1958.

Lines 9, 21, 39 are based on constant price values derived by deflating current price values by the price index implicit in either gross domestic product or net domestic product, at factor cost, both from ibid.

Lines 10 and 37, col. 1 are based on constant price values derived by deflating current price values by the price index implicit in gross national product, both from ibid.

Columns 3 and 4: Constant price values were derived by subtracting from columns 1 and 2, respectively, estimated capital consumption. The latter was assumed to be the same percentage of gross domestic product (or gross

(5)	(6)	(7)	(8)
2.00			
1.97	1.76		
(1950-56) 1.28			
(1951-56) 1.48			
3.48		65.1	
(1952-57) 3.91	(1952-57) 3.91		
	15.9		
3.34	3.69		
1.81		50.6	15.4
2.62		(1951-56)64.2	(1951-56)31.3
(1951-56) 2.06			
5.54		47.9	37.9
5.00	5.43		
(1951-56) 5.65			
1.26		71.7	
		(1953-57)62.8	(1953-57)22.9
6.81	7.63	57.9	
3.18		51.1	28.9
		57.2	
		68.4	22.6
(1951-56) 6.27			(1951-55)24.4
		(1950-56)56.9	

national product in lines 16, 29, and 44) as in current prices, for which the values are given in ibid.

For lines 49 and 54 the constant price values are given in ibid.; for lines 50 and 55 they were derived by deflating the current price values, given in ibid., by the cost of living index given in the United Nations, Statistical Yearbook, 1958.

Column 5: Entries are derived by dividing Appendix Table 1, column 4 by column 1 of this table (or column 2 when column 1 is not given).

Column 6: Entries are derived by dividing the proportion of gross domestic capital formation to gross domestic product, both in constant prices, 1951-57 (or years indicated) by column 1 of this table (or column 2 when column 1 is not given). The proportion is based on values given in the United Nations, Yearbook of National Accounts Statistics, 1958.

Columns 7 and 8: Entries are percentages based on current price values for the periods covered in Appendix Table 1 from the sources cited there unless otherwise indicated. In line 46 gross domestic capital formation is used rather than gross fixed capital formation and in line 49 net domestic capital formation (from the source cited for Appendix Table 2, line 50) is used.

Appendix Table 4.
Rise Per Year in Gross Product and Gross Fixed Capital Formation Proportions by Sectors, Post-World War II Years

		Period Covered	Agriculture, Forestry, & Fishing	Mining, Manufacturing, Const., Elec., Gas, & Water	Transportation & Communication	Services	Total
		(1)	(2)	(3)	(4)	(5)	(6)
	Rise per Year, Gross Product in Constant Prices (%)						
	Groups I & II						
1.	United Kingdom	1951-53 to 1955-57	1.86	3.89	2.74	1.73	2.88
2.	Denmark	1951-53 to 1955-57	1.61	2.76[a]	4.18	1.93[a]	2.30
3.	Finland	1951-53 to 1955-57	0.76	7.41	5.51	4.19	4.80
4.	Norway	1951-53 to 1955-57	0.51	5.01	6.50	2.45	3.81
	Groups III & IV						
5.	Austria	1951-53 to 1955-57	3.24	7.60[b]	5.74	7.52[b]	6.83
6.	Greece	1951-53 to 1955-57	6.69	8.56[a]	5.55	5.58[a]	6.60
7.	Italy	1951-53 to 1955-57	2.29	9.18	6.49	3.30	5.59
	Groups V & VI						
8.	Portugal	1952 to 1955-57	2.93	5.90	4.23	3.21	4.19
9.	Ecuador	1951 to 1954-56	5.16	6.46	5.28	7.69	6.33
10.	Honduras	1950-52 to 1954-56	9.12	4.73	4.48	0.58	1.32
	Proportion, Gross Fixed Capital Formation to Gross Domestic Product, Based on Constant Price Totals (%)						
	Groups I & II						
11.	United Kingdom	1952-56	11.5	12.0	18.8	15.8	13.9
12.	Denmark	1952-56	6.0	9.1[a]	43.6	23.5[a]	17.1
13.	Norway	1952-56	19.8	20.6	56.1	32.1	29.6
	Groups III & IV						
14.	Austria	1952-56	19.7	12.1[b]	56.1	84.6[b]	20.8

15.	Greece	1952-56	2.6	16.1[a]	45.5	18.9[a]	14.2
16.	Italy	1952-56[c]	10.6	15.3	50.5	27.8	19.9
	Group V						
17.	Portugal	1952-56	5.9	12.6	47.9	18.9	14.2
	Proportion, Gross Fixed Capital Formation to Gross Domestic Product, Based on Current Price Totals (%)						
	Groups I & II						
18.	United Kingdom	1952-56	11.5	12.2	18.5	16.1	14.2
19.	Denmark	1952-56	6.9	9.5[a]	42.2	23.9[a]	17.9
20.	Finland	1952-56	13.8	18.8	24.9	47.3	25.9
21.	Norway	1952-56	19.7	21.0	47.3	33.0	28.9
	Groups III & IV						
22.	Austria	1952-56	20.6	12.3[b]	57.2	84.4[b]	21.2
23.	Greece	1952-56	2.7	15.5[a]	30.2	19.8[a]	14.0
24.	Italy	1952-56	11.2	15.4	48.9	27.3	19.9
	Groups V & VI						
25.	Portugal	1952-56	5.8	12.7	47.2	19.2	14.2
26.	Ecuador	1951-55	7.9	16.5	29.7	9.9	11.5
27.	Honduras	1951-55	9.9	11.9	39.2	19.3	14.5

Source: United Nations, Yearbook of National Accounts Statistics, 1958, for all countries except Honduras, for which data are from ibid., 1957.

Lines 1-10: Gross domestic product at factor cost except for Austria, for which only gross national product at market prices is available.

Lines 11-27: Terminal years are at half weight in the average for the period. Since the capital formation estimates are given in market prices and the product estimates at factor cost (except for Austria) the latter were adjusted to market prices by the ratio, for the period covered, of the countrywide gross domestic product at market prices to the countrywide gross domestic product at factor cost.

a. Construction is included with services.

b. Trade and services other than finance, public administration, and dwellings are included with manufacturing.

c. Since the industrial distribution of capital formation in constant prices is not available for 1952, we assumed it to be the same as that for 1953.

Appendix Table 5.
Percentage Distribution by Sectors of Additions to Gross Domestic Product in Constant Prices, 1951 to 1957

	Agriculture, Forestry, & Fishing	Mining, Manufacturing, & Elec., Gas, & Water	Construction	M Sector (2 + 3)	Transportation & Communication	Trade & Finance	Dwellings	Public Administration	Other Services	S Sector (6+7+8+9)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Groups I & II										
1. Belgium	3.6	49.3	6.1	55.4	10.1	10.9	3.1	2.7	14.2	30.9
2. United Kingdom	4.9	52.7	8.3	61.0	9.8	14.1[a]	4.9[a]	-2.4	7.8	24.4
3. Denmark	27.7	25.0	5.3	30.3	14.9	15.1	2.3	9.0	0.6	27.0
4. Finland	0.9	54.2	12.1	66.3	6.5	12.6	3.4	9.3	0.9	26.2
5. Germany, West	0.2	57.7	5.4	63.1	6.0	18.0	2.7	4.1	5.9	30.7
6. Norway	4.4	38.2	9.3	47.5	25.8	14.5	2.2	0.7	4.9	22.3
Groups III & IV										
7. Argentina	19.2	21.4[b]	2.5	23.9	7.1[c]	12.6[ac]	10.3[a]			49.8[b]
8. Austria (gross national product)	9.5	53.3	4.6	57.9	3.6	14.5[d]	[d]	4.3	10.2[d]	29.0
9. Chile (net domestic product)	0.4	38.1	-7.7	30.4	9.8	18.3	13.2	20.6	7.3	59.4
10. Brazil (net domestic product)	30.4			26.3	10.9	14.9[e]	4.3	3.2	10.0[e]	32.4
11. Greece	38.2	26.4	5.6	32.0	4.8	14.2	8.0	0.9	1.8	24.9
12. Italy	10.6	52.0	12.8	64.8	7.2	9.8	0.7	5.1	1.8	17.4
13. Turkey	20.9	16.3	9.9	26.2	16.1	11.6	7.0	11.3	7.6	36.9

Groups V, VI, & VII

14. Portugal (1952 to 1957)	22.1			51.6	4.5	14.4	3.2	4.2	0	21.8
15. Ecuador (1951 to 1956)	30.9	17.7	6.1	23.8	3.7	22.5	6.5	7.9	4.7	41.6
16. Honduras	31.4	22.4	3.3	25.7	9.8	14.8	6.1	6.5	5.7	33.1
17. Belgian Congo	21.9	34.4	7.4	41.8	8.9	13.1[e]	2.7	8.4	3.2[e]	27.4
18. Burma	35.6				2.6			15.5		
19. Cambodia	22.7	14.1	3.5	17.6	[f]	17.9[d]	[d]	28.9	12.9[d]	59.7
20. India (net domestic product, 1950 to 1956)	43.2			16.9						
21. Morocco (1951 to 1956)	28.8	30.1	-8.8	21.3		3.7		28.8	17.5	
22. Pakistan (net domestic product)	41.0	30.4	[g]		2.8	10.9	2.5	7.6	4.8[g]	25.8
23. Thailand (1951 to 1956)	-19.8	16.4	12.1	28.5	15.4	45.0[a]	8.3[a]			75.9

Source: United Nations, Yearbook of National Accounts Statistics, 1958. Unless otherwise indicated the percentages are based on the change from 1951 to 1957 in the constant price totals of gross domestic product originating in the given sectors. For the United Kingdom we derived the absolutes by relating the indexes on a 1948 base to the 1954 current price values, both given in ibid.

a. Finance is included with dwellings.
b. Electric, gas, and water are included with services.
c. The total for transportation and communication and trade, as given, was broken down on the basis of the relationship of the two in Chile.
d. Finance and dwellings are included with other services.
e. Finance is included with other services.
f. Transportation is distributed among the other sectors.
g. Construction is included with other services.

Appendix Table 6.
The Government Share and the Financing of Gross Domestic Capital Formation, Averages for Post-World War II Years

Countries Grouped by Per Capita Product	Government Consumption Expenditures as % of Gross National Product	Government Sector Product as % of Gross Domestic Product	% Shares of Gross Domestic Capital Formation Financed by: Net Domestic Savings	Household Savings	General Government Savings	Private Corporate Savings
	(1)	(2)	(3)	(4)	(5)	(6)
Group I						
1. Australia	10.2		70.1	35.7		12.5
2. Belgium	11.4	6.1	49.7	49.7	-3.4	3.5
3. Canada	13.9	6.3	46.4	21.6	14.0	9.2
4. New Zealand	13.2	(1948-53) 3.4	61.9			
5. Sweden	16.5	(1949-51) 7.1				
6. Switzerland	12.1		70.5			
7. United Kingdom	17.7	6.8	50.8	19.2	4.3	32.0
8. United States	18.3	12.0[b]	54.7	29.0		12.6
Group II						
9. Denmark	12.6	8.8	65.8 (65.8)	(1951-55)39.1	(1951-55)19.3	
10. Finland	12.2	9.3				
11. France	14.8	(1947-49)12.0	42.5 (43.1)	17.8	11.8	
12. Germany, West	14.7	8.6	73.5 (74.5)	(1951-56)31.5	(1951-56)35.0	
13. Netherlands	14.2	7.2	66.1	20.0	26.3	18.8
14. Norway	11.9	4.0	62.0		23.1	
15. Venezuela			52.4			
Group III						
16. Argentina	13.4	(1947-54) 9.7	41.0			
17. Austria	13.5	7.8[a]	62.5	28.8	25.7	
18. Chile	11.9	11.0[b]	1.7			

19.	Ireland	14.3		9.4	36.4	30.1	-6.8	
20.	Israel	21.1	(1952-56)	20.1[b]	-15.8			
21.	Puerto Rico	12.9		12.1	-20.2			
	Group IV							
22.	Brazil	12.1		7.8[b]	64.6 (62.2)	19.6	13.7	
23.	Colombia	12.2		6.3[b]	52.2 (52.9)	33.2		
24.	Costa Rica	9.4		8.4	55.2 (51.1)	16.9	20.2	
25.	Cuba	13.3			49.4			
26.	Greece	13.5		7.8	35.2		3.3	
27.	Italy	11.9		10.2	47.3 (50.8)		7.9	
28.	Lebanon		(1951-56)	6.2[b]				
29.	Malaya	10.2						
30.	Mexico	4.8	(1947-50)	4.7				
31.	Panama	13.2	(1954-56)	3.5	24.6	-22.2	33.4	13.4
32.	Turkey	11.6		8.2				
33.	Union of South Africa	11.4		9.5[b]	60.3 (64.3)	(1953-57) 33.6	(1953-57) 13.3	
	Group V							
34.	Dominican Rep.	12.7	(1946)	8.0				
35.	El Salvador		(1950)	5.7				
36.	Guatemala	11.8	(1949)	7.1	57.2			
37.	Iraq	17.4			89.7			
38.	Jamaica	9.3		6.8	16.9	-6.1	5.7	
39.	Japan	10.5			76.6	38.8		14.1
40.	Nicaragua		(1950)	6.1				
41.	Portugal	11.0		5.1	39.3		17.6	
	Group VI							
42.	Bolivia			3.9[c]	15.1[c]			
43.	Ceylon	13.1		9.8	98.0			
44.	China (Taiwan)	17.8		11.2	33.5 (37.8)		5.5	

(Continued on next page)

Appendix Table 6 (Cont.)	(1)	(2)	(3)	(4)	(5)	(6)
Group VI (Cont.)						
45. Ecuador	13.0	(1951-56) 5.8	57.2 (56.0)	(1951-56)21.8	(1951-56)21.2	(1951-56)13.0
46. Egypt	13.9[d]	(1951-54)15.3[b]				
47. Ghana	6.7	(1948-50) 5.4				
48. Honduras	7.6	3.3	58.2 (58.7)	(1951-55)41.9	(1951-55)12.7	(1951-55) 4.3
49. Paraguay		(1951-56) 4.9				
50. Peru	8.8	14.3[a]	9.1	-8.6	4.1	13.6
51. Philippines	8.1	7.8[e]	16.7	-28.6		29.8
52. Rhodesia & Nyasaland	10.7		48.0	11.3	19.9	
Group VII						
53. Belgian Congo	12.1	9.7	63.5	14.5	17.9	
54. Burma	12.5	8.9	78.3		20.4	
55. Cambodia		(1951-57)11.2[c]				
56. Haiti	7.3					
57. India		5.0[b]				
58. Indonesia	13.6	(1951-52) 6.1				
59. Kenya		(1951-57)10.9[b]				
60. Korea, South	11.5	(1953-57) 7.1				
61. Morocco	8.1	7.2	60.2	34.5	21.4	
62. Nigeria	4.5	5.1	60.3			
63. Pakistan		(1951-57) 5.6[b]				
64. Thailand		(1947-53) 5.4				
65. Uganda		(1950) 5.4				

Entries are percentages based on current price values for the periods covered in Appendix Table 1 from the sources cited there unless otherwise indicated.

Column 2, lines 4, 5, 11, 16, 30, 34, 35, 36, 40, 47 (Gold Coast), 58, 64, and 65 are from Simon Kuznets, "Quantitative Aspects of the Economic Growth of Nations, II. Industrial Distribution of National Product and Labor Force," Economic Development and Cultural Change, Supplement to Vol. V, No. 4, July 1957, App. Table 1, pp. 62 ff.

Line 48, columns 4-6 are from the United Nations, Yearbook of National Accounts Statistics, 1957.

Line 57 is from ibid., 1958.

Column 3, lines 11, 22, 23, 24, and 44 contain two entries because of inconsistencies in the original source; and lines 9, 12, 33, 45, and 48 because of differences in the periods covered. The entries in parentheses are comparable with columns 4-6.

a. Based on GNP.
b. Based on NDP.
c. Based on constant price values.
d. Based on GDP.
e. Based on NNP.

Appendix Table 7.
Share of Gross Domestic Capital Formation Financed by Household Savings and Underlying Series, Averages for Post-World War II Years

Countries Grouped by Per Capita Product	Income of Households as % of Gross Domestic Product	Direct Taxes as % of Income of Households	Disposable Income as % of Gross Domestic Product	Household Savings as % of:		
				Disposable Income	Gross Domestic Product	Gross Domestic Capital Formation
	(1)	(2)	(3)	(4)	(5)	(6)
Group I						
1. Australia	81.2	9.9	73.2	13.6	10.0	35.7
2. Belgium	90.8	12.3	79.7	10.1	8.0	49.7
3. Canada	74.0	8.8	67.5	8.0	5.4	21.3
4. Sweden	82.2	18.4	67.0	7.5	5.1	23.6
5. United Kingdom	80.3	13.0	69.9	4.2	3.0	18.9
6. United States	80.5	14.8	68.6	7.6	5.2	28.8
Group II						
7. Denmark	(1951-55)87.2	12.5	76.3	9.5	7.3	39.1
8. France	82.9	14.3	71.0	4.6	3.2	17.8
9. Netherlands	80.3	17.4	66.3	7.2	4.8	20.0
Group III						
10. Austria	88.8[a]	18.9	72.1[a]	8.8	6.4[a]	28.8
11. Ireland	89.0	5.2	84.4	5.2	4.4	30.0

(Continued on next page)

Appendix Table 7 (Cont.)

		(1)	(2)	(3)	(4)	(5)	(6)
	Group IV						
12.	Colombia	81.5	2.6	79.4	5.3	4.2	33.7
13.	Costa Rica	78.9	4.2	75.6	4.2	3.2	15.5
14.	Panama (1953-56)	81.9	4.1	78.5	-3.6	-2.9	-22.0
15.	Union of South Africa (1953-57)	78.5[a]	5.5	74.2[a]	11.3	8.4[a]	33.6
	Group V						
16.	Jamaica	82.0	1.5	80.8	-1.3	-1.0	-6.2
17.	Japan	78.0	9.4	70.7	15.2	10.7	37.4
	Group VI						
18.	Ecuador (1951-56)	76.9	2.9	74.7	4.2	3.1	21.8
19.	Honduras (1951-55)	83.1	0.5	82.6	7.8	6.5	41.9
20.	Peru	67.8[a]	2.1	66.3[a]	-3.4	-2.2[a]	-8.6
21.	Philippines	83.3	1.5	82.1	-3.0	-2.4	-28.6
22.	Rhodesia & Nyasaland	63.8	5.3	60.4	6.7	4.1	11.3
	Group VII						
23.	Belgian Congo	65.1	6.1	61.1	6.9	4.2	14.5
24.	Morocco	87.2	1.2	86.2	7.7	6.7	34.4

Entries are percentages based on current price values for the periods covered in Appendix Table 1 from the sources cited there unless otherwise indicated.

Wherever possible income of households includes transfers to and from government on a net basis. Where this was not possible, direct taxes include transfers to government and income of households includes transfers from government.

Line 19 is from the United Nations, Yearbook of National Accounts Statistics, 1957.

a. Based on GNP.